COUNTRY SERVICE
MANUAL

JOHN LYSAGHT (AUST.) PTY. LTD.

SYDNEY - MELBOURNE - ADELAIDE
BRISBANE - FREMANTLE

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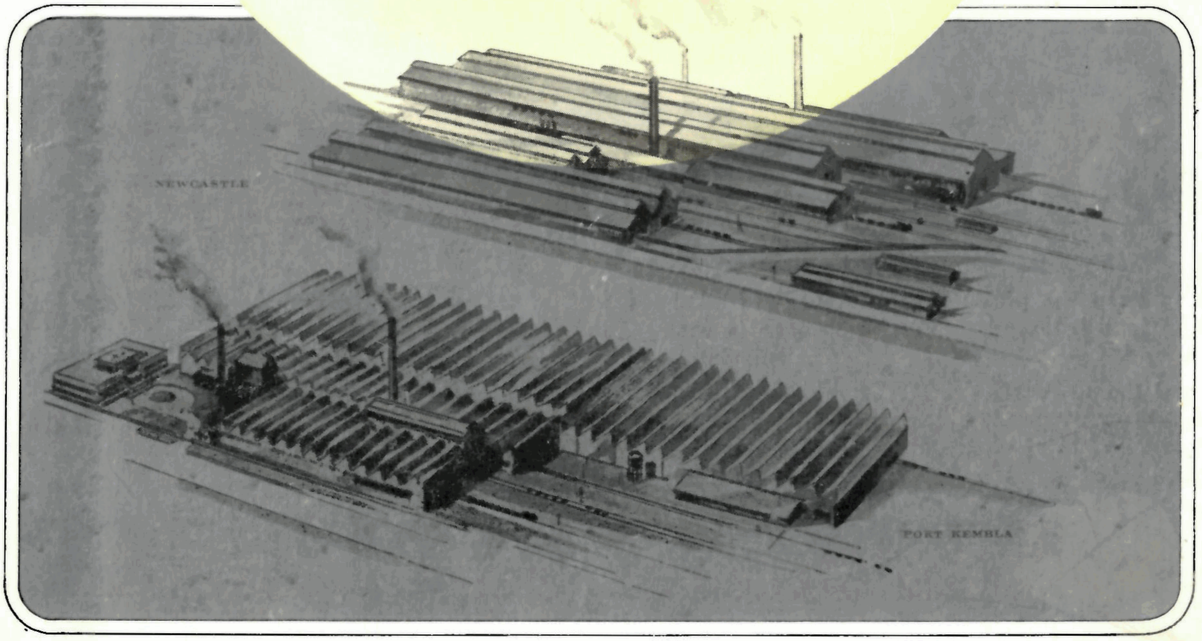
LYSAGHT'S
ORB
COUNTRY SERVICE



JOHN LYSAGHT (AUSTRALIA) PTY. LTD.

SYDNEY MELBOURNE BRISBANE ADELAIDE FREMANTLE

INTRODUCTION

It has long been the policy of John Lysaght (Aust.) Pty. Ltd. to extend help and practical assistance to the man on the land.

To this end the COUNTRY SERVICE MANUAL has been produced—making available to the Primary Producer complete and comprehensive data sheets covering the construction of a wide range of modern farm buildings.

Combining the latest ideas from overseas with the best of proven local designs, these data sheets illustrate the efficient and economical manner in which the Company's products can be utilised to overcome the building problems to-day encountered by the Primary Producer.

Finally, we wish to take this opportunity of thanking the various Governmental Departments and manufacturers whose whole-hearted support and co-operation helped to make the production of this publication possible.

JOHN LYSAGHT (AUST.) PTY. LTD.

LYSAGHT'S
COUNTRY SERVICE

PRODUCTS SECTION

LYSAGHT
ORB
AUSTRALIA

JOHN LYSAGHT (AUST.) PTY. LTD.

FOREWORD

The data sheets published in this section are intended as a general introduction to Lysaght's Products. It is necessary to repeat certain detail on successive sheets, in order to answer enquiries received for information on one particular category of our products. By having self-contained data sheets as included in this manual, individual sheets can be provided to answer a specific enquiry. This section, though included as a part of the Country Service Manual, Building Service Manual, or other Lysaght's Manuals, will be supplied on demand as a separate brochure.

LYSAGHT'S COUNTRY SERVICE

BLACK STEEL SHEETS

GENERAL.—The extraordinary progress that has been made in the application of Lysaght's Black Steel Sheets to so many and varied of our present-day requirements has only been possible by the scientific production of special quality sheets for particular purposes.

Research work is constantly carried out with a view to improving existing products and developing new ones to meet fresh exacting industrial requirements.

QUALITIES OF BLACK SHEET

SUNSTAR.—Sunstar is the standard sheet in use for a wide range of working-up purposes. It is manufactured in three different types to meet the wide variety of applications for which this material is specially suited.

SUNSTAR
C.R.C.A.
AUSTRALIA

This is the standard quality C.R.C.A. sheet, and covers the greater part of the demand for a versatile general purpose material for a wide range of applications. If specified, Sunstar can be provided with a "Pickle Finish" surface.

SUNSTAR
D.O.
AUSTRALIA

Sunstar D.O. is for special requirements where a surface reasonably free from scale is desirable in addition to the well-known properties of Sunstar C.R.C.A.

SUNSTAR
H.R.
AUSTRALIA

Sunstar H.R. is a quality provided in the heavier gauges only, and is particularly suitable for applications such as light structural work, where a finer grained, slightly stiffer sheet which retains the ductile properties of Sunstar C.R.C.A. is desired. If specified this quality can be provided with a "Pickle Finish" surface.

SOUTHERN
CROSS
AUSTRALIA

SOUTHERN CROSS.—This blued sheet is designed to meet the demand for a material combining the well-known physical properties of SUNSTAR C.R.C.A. sheets with a surface suitable for fine finishes. The uniform and tightly adherent oxide film affords considerable protection, and is an excellent base for the application of decorative finishes.

BY PRODUCTS

During the manufacture of black steel sheets, a certain number of sheets are rejected as unsuitable for packing as prime sheets. This material is quite suitable for many uses.

COMMON BLACK.—Sheets which are rejected from our branded qualities for surface imperfections, split edges, or faulty dimensions, are sold as "COMMON BLACK." These sheets are supplied reasonably flat, and are generally available in suitable sheet sizes.

WASTE—"BLACK WASTE SHEETS."—The general defects encountered in this quality are tears or splits, generally on the edges, surface imperfections such as scale, and small holes. Waste is classified "Sorted" and "Unsorted." In both types all material in any one bundle is of approximately the same gauge. Bundles of sorted Waste are made up of sheets approximately of the same length and width. Unsorted Waste consists of material varying greatly in length and width. Pieces may be as small as 12 inches square.

SPECIAL QUALITIES

CARBON STEELS.—For sheet steel with high tensile characteristics or increased hardness and abrasion resistance a higher carbon content is needed than is found in the ordinary quality black sheet. This carbon content varies with the purpose for which the steel sheet is needed and gives rise to the standard carbon qualities.

C30	is a higher tensile sheet used mainly for structural work.
C65	for shovels, plough discs, and miscellaneous hard-wearing or cutting edges.
C80	A superior quality carbon steel sheet used for circular and straight saws or other high grade cutting edges.
C115	Used mainly for cutlery and other small cutting articles.

ELECTRICAL STEELS.—The steel core components of motors, alternators, and transformers are made up of high quality sheet steel laminations. The stringency of laboratory tests, inspection and supervision carried out by a staff of trained metallurgists ensure that Lysaght's Electrical Steels compare favourably with similar sheets produced abroad. Various qualities are made for various purposes, and full details will be provided on application to this firm.

The STALLOY types are used for transformer work and other applications where low electrical losses are essential. MEDIUM RESISTANCE and SPECIAL LOHYS are used for high efficiency motors of all types, large motor generators, small transformers and reactors.

SPECIAL PROCESSING

CROPPING.—Sheets that have been flattened by hydraulic stretching have a slight indented mark across each end, about $1\frac{1}{2}$" from the edge, caused by the grips of the flattening machine. In all cases where it is essential for the grip marks to be cut off, but not necessary for the sheets to be resheared, the sheets should be ordered cropped.

RESHEARING.—Sheets are not guaranteed exact to size. The variation is always over the size ordered, and is usually $\frac{1}{4}$"-1" in length and $\frac{1}{8}$"-$\frac{1}{4}$" in width. When sheets are required exact to dimensions, it is necessary to order them "Resheared." Measurements will then be guaranteed not to vary more than $\frac{1}{16}$".

FULLY RESHEARED.—The term fully resheared covers the two operations of cropping and reshearing.

CIRCLES.—Machine-cut circles can be supplied from 6" to 42" dia. in any gauge from 10g.-30g. and up to 48" dia. in 10g.-20g.

PACKING

Black sheets are packed in envelopes, bundles, or cases.

STEEL ENVELOPES.—Envelopes are made of Black Sheet Steel which, in addition to protecting the contents during transit or in storage, can be used for working-up purposes when empty. Envelopes contain approximately 10 cwt. of sheets.

BUNDLES.—10-cwt. bundles are a convenient method of packing sheets of the heavier gauges, but we accept no responsibility for damage, however arising, when this method is adopted. One-ton or two-ton packages may be provided if desired.

CASES.—Strong skeleton cases can be supplied at an extra cost.

NOTE.—20g. and lighter stock Black Sheets are packed in envelopes. 18g. and heavier stock Black Sheets are packed in bundles. No charge is made for packing, but the gross weight is charged in each instance.

PRODUCTS SECTION

LYSAGHT'S
COUNTRY SERVICE
BLACK STEEL SHEETS

SHEET 1211

BIRMINGHAM GAUGE

The standard gauge table used for Black Steel Sheets is known as the Birmingham Gauge, or B.G. It must not be confused with either the Birmingham Wire Gauge (B.W.G.) or the Standard Wire Gauge (S.W.G.) Wherever the word gauge is used in these pages the Birmingham Gauge is implied.

It is useful to remember that:—

10g. (B.G.) is $\frac{1}{8}$" thick.
16g. (B.G.) is $\frac{1}{16}$" thick.

and that for every increase of 6 in the number of the gauge the thickness of the sheet is reduced by a half.

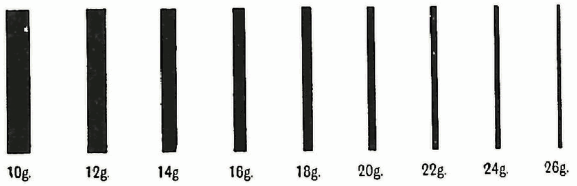


Illustration showing the approximate thickness of sheets according to the Birmingham Gauge.

GAUGE TABLE

Gauge B.G.	Thick-ness in inches	Gauge B.G.	Thick-ness in inches	Gauge B.G.	Thick-ness in inches
8	.1570	16	.0625	24	.0247
9	.1398	17	.0556	25	.0220
10	.1250	18	.0495	26	.0196
11	.1113	19	.0440	27	.0174
12	.0991	20	.0392	28	.0156
13	.0882	21	.0349	29	.0139
14	.0785	22	.0312	30	.0123
15	.0699	23	.0278		

GAUGE TOLERANCES

The following tolerances are those customarily permitted by the trade in Black Steel Sheet:—

		Total
$\frac{3}{16}$" to 13 gauge	.008 up and down	.016
14 and 15 ,,	.006 ,, ,, ,,	.012
16 to 18 ,,	.004 ,, ,, ,,	.008
19 to 22 ,,	.003 ,, ,, ,,	.006
23 gauge and thinner	.002 ,, ,, ,,	.004

APPROXIMATE WEIGHT PER SHEET IN LBS. OF STOCK SIZES

6 FEET LENGTHS:

Gauge	Width 24"	30"	36"
10	62.1	77.5	92.9
12	49.3	61.5	73.7
14	39.1	48.8	58.5
16	31.0	38.7	46.5
18	24.6	30.8	36.9
20	19.5	24.4	29.3
22	15.5	19.4	23.2
24	12.3	15.4	18.4
26	9.8	12.2	14.6
28	7.8	9.7	11.6
30	6.2	7.7	9.2

7 FEET LENGTHS:

Gauge	Width 24"	30"	36"
10	72.3	90.3	108.3
12	57.4	71.7	85.9
14	45.6	56.9	68.2
16	36.2	45.1	54.1
18	28.7	35.0	43.0
20	22.8	28.4	34.1
22	18.1	22.6	27.0
24	14.3	17.9	21.5
26	11.4	14.2	17.0
28	9.0	11.3	13.5
30	7.2	9.0	10.7

8 FEET LENGTHS:

Gauge	Width 24"	30"	36"
10	82.6	103.1	123.6
12	65.5	81.8	98.1
14	52.0	64.9	77.9
16	41.3	51.5	61.8
18	32.8	40.9	49.1
20	26.0	32.5	38.9
22	20.6	25.8	30.9
24	16.4	20.5	24.5
26	13.0	16.2	19.5
28	10.3	12.9	15.5
30	8.2	10.2	12.3

APPROXIMATE SHEETS PER HALF TON IN STOCK SIZES

6 FEET LENGTHS:

Gauge	Width 24"	30"	36"
10	18	14	12
12	23	18	15
14	29	23	19
16	36	29	24
18	45	36	30
20	57	46	38
22	72	58	48
24	91	73	61
26	115	92	77
28	144	116	96
30	182	146	121

7 FEET LENGTHS:

Gauge	Width 24"	30"	36"
10	15	12	10
12	20	16	13
14	25	20	16
16	31	25	21
18	39	31	26
20	49	39	33
22	62	50	41
24	78	63	52
26	98	79	66
28	124	99	83
30	156	125	104

8 FEET LENGTHS:

Gauge	Width 24"	30"	36"
10	14	11	9
12	17	14	11
14	22	17	14
16	27	22	18
18	34	27	23
20	43	34	29
22	54	43	36
24	68	55	46
26	86	69	58
28	109	87	72
30	137	110	91

In general sheets can be provided up to 36" wide with a maximum length of 12', or 48" wide with a maximum length of 10'. Special sizes can be supplied at an additional cost.

LYSAGHT'S COUNTRY SERVICE

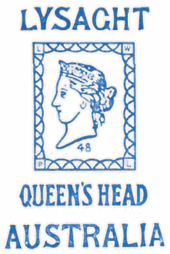
GALVANIZED FLAT SHEETS

GENERAL.— Ferrous metals, being susceptible to corrosion, must be protected from the action of air and water to prevent deterioration from rusting. The most satisfactory protective coating is one of hot dipped galvanizing, zinc affording valuable electro chemical protection to steel.

The thickness of the base steel sheet of any gauge of Galvanized sheet is the same before coating as the Black Sheet of the same gauge number. The hot dipped galvanizing process coats the sheet with a protective zinc coating, which varies in the particular qualities from 2 oz.-1.5 oz. per square foot of sheet (both sides). This is only sufficient to give an additional thickness of between two and three thousandths of an inch.

Lysaght's sheets conform with the appropriate classification set out in the Australian Standards Specification A.20—1947.

QUEEN'S HEAD BRAND.



Prime sheets of Lysaght's Galvanized flat steel sheets are branded with the well-known rectangular shaped Queen's Head brand. These quality flat sheets are the most uniform and reliable plain Galvanized sheets on the market.

PACKING.— Flat sheets are packed in wooden crates containing approximately 10 cwt. of sheets. Markings are stencilled on each individual case to facilitate identification.

BY PRODUCTS.— During the inspection of Galvanized Sheets, certain sheets are rejected from prime quality grading into U.B's (Unbranded) and Waste.

U.B.— Unbranded sheets may contain small uncoated areas, corners off, and broken sides. Extensive appearance defects such as rough and lumpy coatings, dark dry areas, or salt stains may be included.

Such sheets carry the brand

48
UB

WASTE.— Sheets which are too badly damaged or marked for U.B. grading are sold as Waste. Any one package of Waste consists of defective sheets approximately to the one gauge and size, with defects including large uncoated areas, corners off, broken sides, ends, and holes. Pinched, crinkled and cobbled sheets are also included.

EXPLANATORY NOTES ON BRANDS OF FLAT SHEETS.— For the information of users, and to facilitate means of identifying life of galvanized sheets, the year of manufacture is incorporated in the rectangular frame of the Queen's Head brand, the figures being located at the base of the Queen's neck. Sheets are branded on one side only, and sheets manufactured at Port Kembla Works have the letter "K" incorporated in all brands.

Between the brand and the end of the sheet is stamped the identification number of the inspector who passed the sheet. The packer's initials are stamped on the side of the case, and the packer's slip, giving the packer's name and date of packing, is enclosed in all cases. These measures are taken to protect our mutual interests, and should you find it necessary to make a complaint, please endeavour to quote Packer's initials, Inspector's number, year of manufacture, and any other details that might assist our Service Department to investigate your complaint, and take any action necessary to remedy the causes.

Though of no significance in identification, enquiries have been made from time to time as to the meaning of the letters in the corners of the rectangular frame. Whereas at one time these used to be L.N.W.L., referring to Lysaght's Newcastle Works Ltd., these now read L.W.P.L., meaning Lysaght's Works Pty. Ltd.

LYSAGHT
ORB
AUSTRALIA

PRODUCTS SECTION

SHEET 1321

LYSAGHT'S
COUNTRY SERVICE
GALVANIZED FLAT SHEETS

6 FEET LENGTHS: **APPROXIMATE WEIGHT PER SHEET IN LBS.**

Gauge	Width			
	24"	30"	36"	48"
14	39.62	49.48	59.33	79.04
16	31.68	39.56	47.44	63.20
18	25.23	31.50	37.77	50.32
20	20.26	25.30	30.34	40.42
22	16.28	20.33	24.37	32.47
24	13.06	16.30	19.55	26.04
26 Commercial	8.80	11.01	13.20	17.59

8 FEET LENGTHS: **APPROXIMATE WEIGHT PER SHEET IN LBS.**

Gauge	Width			
	24"	30"	36"	48"
14	52.72	65.83	78.94	105.16
16	42.15	52.63	63.12	84.08
18	33.56	41.91	50.26	66.95
20	26.96	33.66	40.37	53.78
22	21.66	27.04	32.43	43.20
24	17.37	21.69	26.01	34.65
26 Commercial	11.73	14.65	17.57	23.40

6 FEET LENGTHS: **APPROXIMATE COUNT OF SHEETS PER HALF-TON CASE**

Gauge	Width			
	24"	30"	36"	48"
14	29	23	19	15
16	36	29	24	18
18	45	36	30	23
20	56	45	37	28
22	69	56	46	35
24	86	69	58	44
26 Commercial	124	99	84	62

8 FEET LENGTHS: **APPROXIMATE COUNT OF SHEETS PER HALF-TON CASE**

Gauge	Width			
	24"	30"	36"	48"
14	22	17	15	11
16	27	22	18	14
18	34	27	23	17
20	42	34	28	21
22	52	42	35	26
24	65	53	44	33
26 Commercial	92	74	63	46

NOTE.—Following long-established British practice, 26 gauge Galvanized Iron, both corrugated and plain, manufactured in Australia, is lighter than true 26g. It has provided an adequate and economical sheet which has been universally accepted for many years. In the above tables it is described as 26 gauge Commercial.

LYSAGHT'S COUNTRY SERVICE

ZINCANNEAL

GENERAL.—Zincanneal quality sheets are an outstanding Lysaght development. By suitable high temperature treatment zinc is combined with the steel base to form a zinc-iron alloy having remarkable properties as a coating. The resistance to atmospheric corrosion is particularly good, excellent service being obtained under severe conditions such as those met with in coastal locations.

Zincanneal is produced in both flat and corrugated forms as described on this sheet.

PAINTING.—Painting can be carried out immediately on erection or fabrication without priming or fear of subsequent peeling. This is quite understandable when the finely grained matte surface is examined.

Zincanneal is uninjured by heat up to temperatures of 600° F. It can be stove enamelled without in any way damaging the protective surface.

SOLDERING.—Zincanneal is quite satisfactory for soldered joints, but it is generally found to require more care than ordinary Galvanized sheet. If it is remembered that Zincanneal has a much greater resistance to corrosion than has Galvanized iron, it will be appreciated that this corrosion resistance applies also to soldering fluxes. The first consideration, therefore, is to use a very active flux, such as raw spirits, or as many plumbers prefer, 50% killed spirits, 50% raw spirits. Equally good results have been obtained with 60/40 and 50/50 solders, though some plumbers report a preference for 60/40.

WELDING.—Having a steel base, Zincanneal can be welded or brazed by any normal means. The heat generated by electric arc welding does not destroy the rust-resisting properties, and this material is quite suitable for spot welding. Extensive weathering and corrosion tests have shown that in spite of the temperatures involved in the electric welding processes, considerable protection still remains at the weld.

BRANDS AND QUALITIES

FLAT SHEET

Prime Zincanneal flat sheets are produced in two qualities —Z.A. R.L. (Zincanneal Roller Levelled) and Z.A. Panel Quality.

Z.A. R.L.—

LYSAGHT
ZINCANNEAL
AUSTRALIA
R.L.

This quality is especially suited to, and enjoys increasing popularity for flashings, gutters, downpipes, capping, vents, duct work, and formed work generally, where a perfectly flat sheet is not required.

Z.A. PANEL QUALITY.—

LYSAGHT
ZINCANNEAL
AUSTRALIA
PANEL QUALITY

These sheets are subjected to a final surface improvement process and finished dead flat. The surface provides an ideal base for baked enamels and similar fine finishes.

BY PRODUCTS

SECONDS.—

Z.A.
SECONDS
R.L.

Z.A.
SECONDS
PANEL QUALITY

In the production of prime sheets certain sheets are rejected for imperfections of surface or dimensions into Seconds R.L., or Seconds Panel Quality.

Zincanneal Seconds may contain small uncoated areas, corners off, or broken sides. Extensive appearance defects may be included, such as rough and lumpy coatings, bright patches, yellow stains, black stains, and tree marks.

WASTE.—Complete sheets which are too badly damaged for grading into Seconds are packed as Waste.

Any one package of Waste consists of defective sheets of approximately the same gauge and size, with all defects, including large uncoated areas, corners off, and faults, broken sides, and holes. Pinched, crinkled and cobbled sheets are also included.

CORRUGATED SHEET

BLUE Z.A.—

LYSAGHT
ZINCANNEAL
AUSTRALIA

This quality has the Zincanneal coating applied to a high quality ductile steel base, and may be curved with ease.

RED Z.A.—

LYSAGHT
ZINCANNEAL
AUSTRALIA

This quality is similar in all respects to the Blue Zincanneal with the exception of the steel base. An especially hard steel base provides great rigidity and strength for structural applications such as roofing, walling, and fencing, where these properties are of major importance. Red Zincanneal is not suitable for curving.

BY PRODUCTS

SECONDS.—

Z.A.
SECONDS

Zincanneal Seconds may contain small uncoated areas, corners off, or broken sides. Extensive appearance defects may be included, such as rough and lumpy coatings, salt stains, bright patches, yellow stains, black stains, and tree marks.

WASTE.—Complete sheets which are too badly damaged for grading into Seconds are packed together as Waste.

Any one package of Waste consists of defective sheets of approximately the same gauge and size, with all defects, including large uncoated areas, corner and end faults, broken sides, and holes. Pinched, crinkled and cobbled sheets are also included.

NOTE.— Zincanneal coatings must NOT be confused with lead Terne coatings. Containers of Zincanneal are made to hold ice, water, and food, as in refrigerator cabinets and ice moulds, and the coatings are NOT injurious or poisonous in any way.

PRODUCTS SECTION

LYSAGHT'S COUNTRY SERVICE

ZINCANNEAL FLAT SHEET

SHEET 1421

6 FEET LENGTHS:

APPROXIMATE WEIGHT PER SHEET IN LBS.

Gauge	Width			
	24"	30"	36"	48"
14	39.62	49.48	59.33	79.04
16	31.68	39.56	47.44	63.20
18	25.23	31.50	37.77	50.32
20	20.26	25.30	30.34	40.42
22	16.28	20.33	24.37	32.47
24	13.06	16.30	19.55	26.04
26 Commercial	8.80	11.01	13.20	17.59

8 FEET LENGTHS:

APPROXIMATE WEIGHT PER SHEET IN LBS.

Gauge	Width			
	24"	30"	36"	48"
14	52-72	65.83	78.94	105.16
16	42.15	52.63	63.12	84.08
18	33.56	41.91	50.26	66.95
20	26.96	33.66	40.37	53.78
22	21.66	27.04	32.43	43.20
24	17.37	21.69	26.01	34.65
26 Commercial	11.73	14.65	17.57	23.40

6 FEET LENGTHS:

APPROXIMATE COUNT OF SHEETS PER HALF-TON CASE

Gauge	Width			
	24"	30"	36"	48"
14	29	23	19	15
16	36	29	24	18
18	45	36	30	23
20	56	45	37	28
22	69	56	46	35
24	86	69	58	44
26 Commercial	124	99	84	62

8 FEET LENGTHS:

APPROXIMATE COUNT OF SHEETS PER HALF-TON CASE

Gauge	Width			
	24"	30"	36"	48"
14	22	17	15	11
16	27	22	18	14
18	34	27	23	17
20	42	34	28	21
22	52	42	35	26
24	65	53	44	33
26 Commercial	92	74	63	46

NOTE: CORRUGATED SHEET.—Figures for corrugated Zincanneal sheets are shown on Sheets 1832, 1833.

26g. COMMERCIAL.—Following long-established British practice, 26 gauge Galvanized Iron, manufactured in Australia, is lighter than true 26 gauge. It has provided an adequate and economical sheet which has been universally accepted for many years. 26 gauge Zincanneal sheet is similarly lighter than true 26g. In the above tables this gauge sheet is described as 26 gauge Commercial.

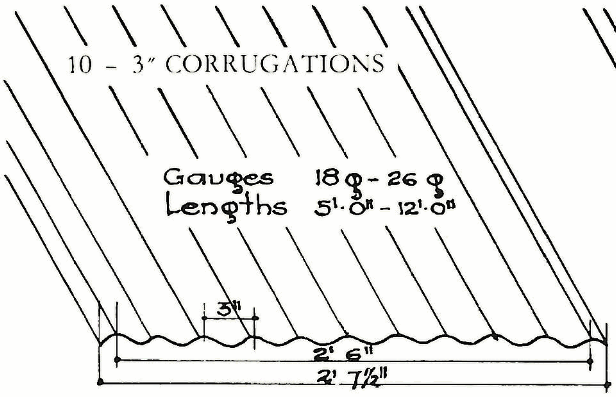
PACKING.—Sheets are packed in wooden crates containing approximately 10 cwt. of sheets. Each sheet carries the processing draft number and inspector's number to facilitate identification. Each case also carries stencilled marks to assist in identification.

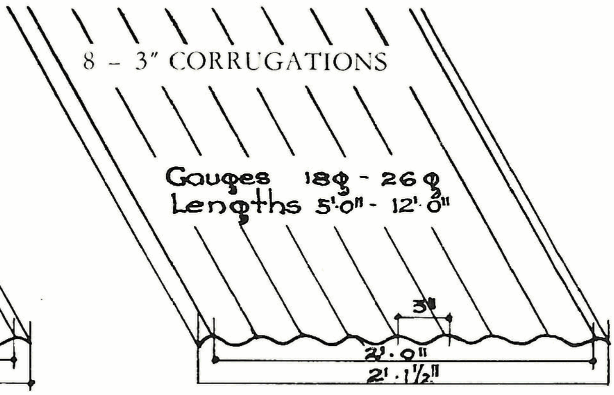
PRODUCTS SECTION

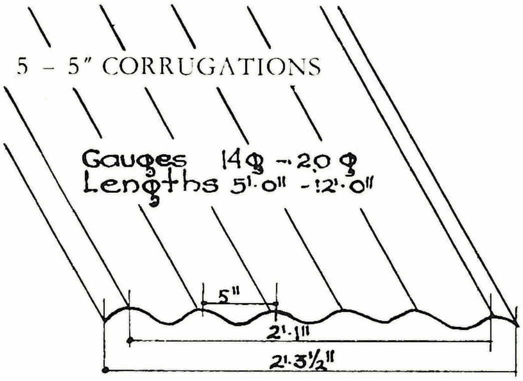
LYSAGHT'S COUNTRY SERVICE

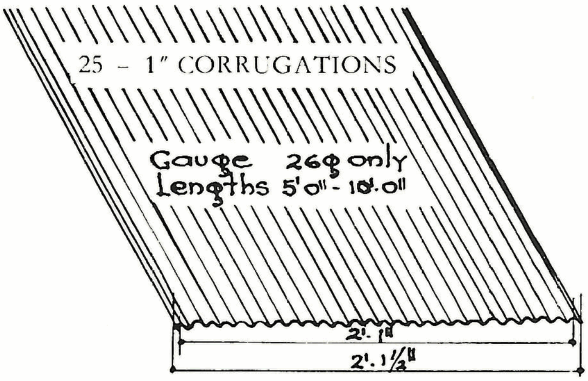
SHEET 1811

STANDARD CORRUGATED SHEETS


10 – 3″ CORRUGATIONS


8 – 3″ CORRUGATIONS


5 – 5″ CORRUGATIONS


25 – 1″ CORRUGATIONS

BRANDS OF CORRUGATED SHEETS

BLUE ORB BRAND

LYSAGHT
ORB
AUSTRALIA

This universally known sheet has a uniformly heavy zinc coating applied to a ductile steel base of the highest quality. It is particularly suitable for applications requiring curving.

BLUE Z.A. BRAND

LYSAGHT
ZINCANNEAL
AUSTRALIA

This quality has the Zincanneal coating applied to a high quality ductile steel base, and may be curved with ease.

RED ORB BRAND

LYSAGHT
ORB
AUSTRALIA

NOT FOR CURVING

Red Orb sheets carry the same high grade coatings as Blue Orb, but an especially hard sheet is used as a base. The extreme rigidity and stiffness specially recommends it for applications such as roofing, walling, or fencing where maximum strength is required. This quality is available in 24 and 26 gauges, and is not suitable for curving.

RED Z.A. BRAND

LYSAGHT
ZINCANNEAL
AUSTRALIA

This quality is similar in all respects to the Blue Zincanneal with the exception of the steel base. An especially hard sheet base provides great rigidity and strength for structural applications such as roofing, walling, and fencing, where these properties are of major importance. Red Zincanneal is not suitable for curving.

LYSAGHT'S COUNTRY SERVICE

STANDARD CORRUGATED SHEETS

GENERAL.—Amongst building materials in common use Lysaght's Corrugated Galvanized or Zincanneal sheets are most popular for their efficiency and economy, being most adaptable to roofing, siding, tank-making, and innumerable minor constructions.

GALVANIZED COATINGS.—The use of hot dipped galvanized coatings for the protection of iron and steel has been well established over a considerable period. Exposure tests carried out in various parts of the world by authoritative bodies in recent years have confirmed the fact that hot dipped galvanizing is the most satisfactory and economical method of protecting ferrous metals, zinc affording valuable electro chemical protection to the base.

ZINCANNEAL.—Zincanneal quality sheets are an outstanding Lysaght development. By suitable high temperature treatment zinc is combined with the steel base to form a zinc-iron alloy having remarkable properties as a coating. Painting can be carried out immediately on erection without priming and without any fear of subsequent peeling. The resistance to atmospheric corrosion is particularly good, excellent service being obtained under severe conditions such as those met with in coastal locations.

CORRUGATIONS.—Lysaght's sheets are produced in corrugations of three different spacings.

The standard 3-inch corrugation is the pitch in common usage. The depth of corrugation is $\frac{3}{4}$", and sheets are produced in two widths:—

(a) 10-3 inch corrugations, which is most popular for roofing and siding, and which has almost completely replaced the old 8-3 inch corrugation sheet. The covering capacity for 10-3 inch sheets is 3% greater than for an equal tonnage of 8-3 inch sheet. In addition fixing costs are reduced.

(b) 8-3 inch corrugations, which is now used mainly for tank-making and minor constructions.

The standard 1-inch corrugation sheet, produced in 26g. only, is 25 corrugations wide. This sheet is most popular for linings, awnings, ceilings, showers, or sheds and country halls, and is gaining an increased popularity as division walls in large country stores.

The standard 5-inch corrugated pitch is produced in a width of 5-5 inch corrugations. This corrugation is used for heavy gauge sheets. These are recommended for wide unsupported coverage tasks, such as awnings, where maximum strength of the sheet as a beam is desirable.

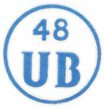
QUALITIES.—As illustrated overleaf, corrugated sheets are manufactured with Galvanized and Zincanneal coatings in both the RED and BLUE varieties.

It is often necessary for tradesmen to walk on roofs during or after erection. Soft sheets so walked on tend to become dented and lead to leaks. Lysaght's have produced RED quality sheets which by their very springiness and toughness are resistant to local indentation, and so admirably suited for roofing construction. As a result of the RED sheets having a base sheet which is tougher, and of a higher tensile value than the fully annealed sheet forming the basis of the ordinary ORB and ZINCANNEAL qualities, these sheets are not suitable for curving. Accordingly they are branded "Not for Curving."

Where sheets have to be curved or where strength is not required, the "BLUE" qualities of ORB and ZINCANNEAL are recommended. A large proportion of ORB sheets are curved for tank-making, for which they are admirably suited.

BY PRODUCTS.—During the inspection of corrugated zinc-coated sheets certain defective sheets are rejected into Unbranded Galvanized quality (U.B.), Zincanneal Seconds, or Waste.

GALVANIZED U.B.—Unbranded sheets may contain small uncoated areas, corners off, and broken sides. Extensive appearance defects such as rough and lumpy coats, dark areas, or salt stains may be included. Such sheets are branded thus:



ZINCANNEAL SECONDS.—These contain the same defects as Galvanized U.B., but in addition they show bright patches, tree marks, and yellow stains.

WASTE.—Any package of Corrugated Galvanized Waste or Corrugated Zincanneal Waste consists of defective sheets of the same gauge and approximately the same size, with all defects including large uncoated areas, corners off, broken sides, and holes. Pinched and crinkled sheets are also included.

PACKING.—Corrugated prime sheets are packed in wooden crates containing approximately 10 cwt. of sheets. Markings are stencilled on each individual case to facilitate identification.

EXPLANATORY NOTES ON BRANDS.—For the information of users, to facilitate identification and to provide means of determining the life of Australian-made sheets, Lysaght's steel sheets carry certain identifying numbers and symbols. The year of manufacture has been incorporated in the Maltese Cross of the Orb brand. It is also included in the outlining circle of the U.B. brand.

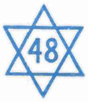
Zincanneal sheets do not carry the date, but have stamped on, instead, the draft number of the batch of sheets being processed.

Between the brand and the end of the sheets is stamped the identification of the inspector who passed the sheet. The date can be determined from this. Zincanneal sheets thus carry two numbers.

Sheets manufactured at Port Kembla Works have the letter "K" incorporated in all brands.

Below the brand on all 22, 24, 26 gauge sheets are stamped the respective figures 22g, 24g, 26g.

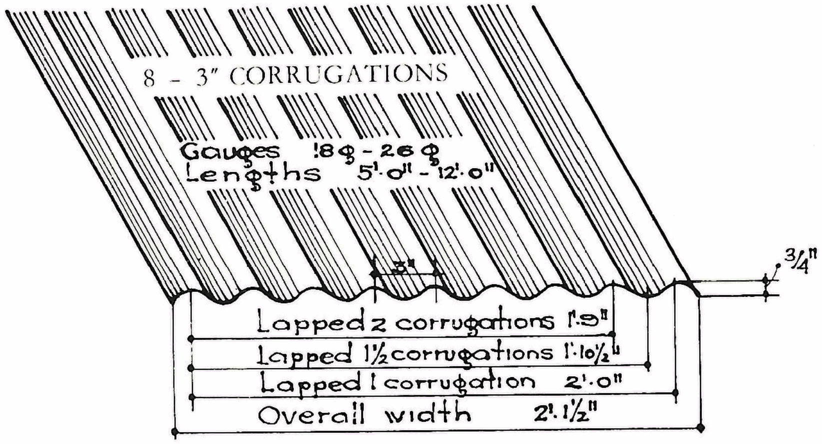
Sheets are branded on one side only with the exception of 24g. BLUE ORB (which is used mainly for tank-making). On the reverse side to the brand of 24g. BLUE ORB is a star device incorporating the year of manufacture, thus:—



The packer's initials are stamped on the side of the case and a large packer's slip giving the packer's name and the date of packing is enclosed in all cases. All of these measures are taken to protect our mutual interest, and should you find it necessary to make a complaint, please endeavour to quote Packer's Initials, Inspector's Number, Year of Manufacture, and any other details that might assist our Service Department to thoroughly investigate your complaint and take any action necessary to remedy the causes.

ROOFING TERNES.—Roofing Ternes were a product of the war years, when zinc was unavailable for civil purposes. These lead-coated sheets are no longer being produced.

8-3 INCH CORRUGATIONS STEEL SHEET
GALVANIZED AND ZINCANNEAL


8 - 3" CORRUGATIONS
Gauges 18g - 26g
Lengths 5'.0" - 12'.0"
3"
3/4"
Lapped 2 corrugations 1'.9"
Lapped 1½ corrugations 1'.10½"
Lapped 1 corrugation 2'.0"
Overall width 2'.1½"

GALVANIZED STEEL SHEET.—Lysaght's "Orb" quality sheet has been favourably known and recommended throughout the world since 1857 as a corrugated sheet of the highest quality. The perfection of galvanizing, the uniformity of gauge and corrugation is endorsed by universal specification. The properties and weights of coating are specially controlled to suit the wide range of applications of corrugated sheets, and conform to the appropriate classification of Australian Standard Specification A.20-1947.

BLUE ORB BRAND.

LYSAGHT
ORB
AUSTRALIA

This universally known sheet has a uniformly heavy zinc coating applied to a ductile steel base of the highest quality. It is particularly suitable for applications requiring curving.

RED ORB BRAND.

LYSAGHT
ORB
AUSTRALIA
NOT FOR CURVING

Red Orb sheets carry the same high grade coatings as Blue Orb, but an especially hard sheet is used as a base. The extreme rigidity and stiffness specially recommends it for applications such as roofing, walling, or fencing, where maximum strength is required. This quality is available in 24 and 26 gauges, and is not suitable for curving.

ZINCANNEAL SHEETS.—Zincanneal quality sheets are an outstanding Lysaght development. By suitable high temperature treatment zinc is combined with the steel base to form a zinc-iron alloy having remarkable properties as a coating. Painting can be carried out immediately on erection without priming or fear of subsequent peeling. The resistance to atmospheric corrosion is particularly good, and excellent service is being obtained under severe conditions such as those met with in coastal locations.

BLUE Z.A. BRAND.

LYSAGHT
ZINCANNEAL
AUSTRALIA

This quality has the Zincanneal coating applied to a high quality ductile steel base, and may be curved with ease.

RED Z.A. BRAND.

LYSAGHT
ZINCANNEAL
AUSTRALIA

This quality is similar in all respects to the Blue Zincanneal with the exception of the steel base. An especially hard sheet base provides great rigidity and strength for structural application such as roofing, walling, and fencing, where these properties are of major importance. Red Zincanneal is not suitable for curving.

PRODUCTS SECTION

SHEET 1832

LYSAGHT'S COUNTRY SERVICE

8-3 INCH CORRUGATIONS STEEL SHEETS GALVANIZED AND ZINCANNEAL

APPROXIMATE WEIGHT PER SHEET IN LBS.

Gauge	Length							
	5'	6'	7'	8'	9'	10'	11'	12'
18	26.18	31.36	36.54	41.73	46.91	52.09	57.27	62.45
20	21.21	25.41	29.60	33.80	38.00	42.20	46.40	50.59
22	17.18	20.58	23.98	27.38	30.78	34.18	37.58	40.98
24	13.89	16.64	19.39	22.14	24.89	27.64	30.39	33.14
26 Commercial	9.37	11.23	13.08	14.94	16.79	18.64	20.49	22.36
26	11.09	13.28	15.47	17.67	19.86	22.06	24.25	26.44

APPROXIMATE COUNT OF SHEETS PER HALF-TON CASE

Gauge	Length							
	5'	6'	7'	8'	9'	10'	11'	12'
18	43	36	31	27	24	22	20	18
20	53	45	38	34	30	27	25	23
22	66	55	48	42	37	33	30	28
24	84	70	60	52	47	42	38	35
26 Commercial	120	100	85	75	66	60	54	50

COVERAGE—MEAN AREA OF SURFACE COVERED BY 1 TON OF SHEET WITH $1\frac{1}{2}$ CORRUGATIONS SIDE LAP AND 6" END LAP

Gauge	Length							
	5'	6'	7'	8'	9'	10'	11'	12'
18	767	778	787	793	798	802	805	808
20	946	961	971	979	985	990	994	997
22	1168	1186	1199	1209	1216	1222	1227	1231
24	1445	1467	1483	1495	1504	1511	1517	1522
26 Commercial	2142	2174	2198	2215	2229	2241	2250	2256

26 GAUGE (Commercial)

COST—ESTIMATE OF COST PER 100 SQUARE FEET

Cost per Ton	Length							
	5'	6'	7'	8'	9'	10'	11'	12'
£30	28/–	27/7	27/3	27/1	26/11	26/9	26/8	26/7
£31	28/11	28/6	28/3	28/–	27/10	27/8	27/7	27/6
£32	29/10	29/5	29/1	28/11	28/9	28/7	28/6	28/4
£33	30/10	30/4	30/–	29/9	29/7	29/6	29/4	29/3
£34	31/9	31/3	30/11	30/8	30/6	30/4	30/3	30/2
£35	32/8	32/2	31/10	31/7	31/5	31/3	31/1	31/–
£36	33/7	33/1	32/9	32/6	32/4	32/2	32/–	31/11
£37	34/7	34/–	33/8	33/5	33/2	33/–	32/11	32/10
£38	35/6	34/11	34/7	34/4	34/1	33/11	33/9	33/8
£39	36/5	35/10	35/6	35/3	35/–	34/10	34/8	34/7
£40	37/4	36/9	36/5	36/1	35/11	35/8	35/7	35/6

24 GAUGE

COST—ESTIMATE OF COST PER 100 SQUARE FEET

Cost per Ton	Length							
	5'	6'	7'	8'	9'	10'	11'	12'
£30	41/6	40/11	40/6	40/2	39/11	39/8	39/7	39/5
£31	42/11	42/3	41/10	41/6	41/3	41/–	40/10	40/9
£32	44/3	43/8	43/2	42/10	42/7	42/4	42/2	42/1
£33	45/8	45/–	44/6	44/2	43/11	43/8	43/6	43/4
£34	47/1	46/4	45/10	45/6	45/3	45/–	44/10	44/8
£35	48/6	47/9	47/2	46/10	46/7	46/4	46/2	46/–
£36	49/10	49/1	48/7	48/2	47/10	47/8	47/6	47/4
£37	51/3	50/6	49/11	49/6	49/2	48/11	48/9	48/8
£38	52/7	51/10	51/3	50/10	50/6	50/4	50/1	49/11
£39	54/–	53/2	52/7	52/2	51/10	51/8	51/5	51/3
£40	55/4	54/6	53/11	53/6	53/2	52/11	52/9	52/7

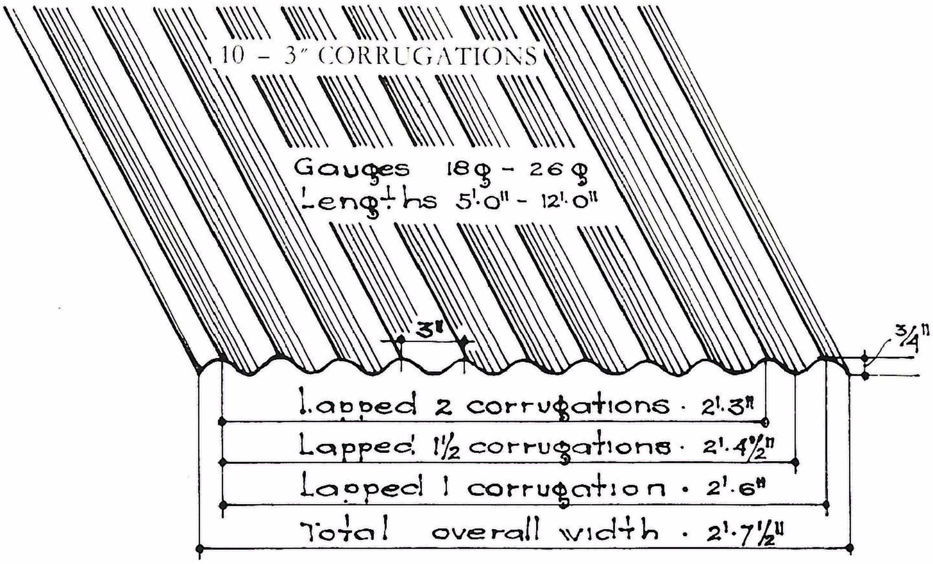
NOTE.— Following long-established British practice, 26 gauge Galvanized Iron, both corrugated and plain, manufactured in Australia, is lighter than true 26 gauge. It has provided an adequate and economical sheet which has been universally accepted for many years. In the above tables it is described as 26 gauge Commercial.

PRODUCTS SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 1833

10-3 INCH CORRUGATIONS STEEL SHEETS GALVANIZED AND ZINCANNEAL


10 – 3″ CORRUGATIONS
Gauges 18g - 26g
Lengths 5'.0" - 12'.0"
3"
¾"
Lapped 2 corrugations · 2'.3"
Lapped 1½ corrugations · 2'.4½"
Lapped 1 corrugation · 2'.6"
Total overall width · 2'.7½"

GALVANIZED STEEL SHEET.—Lysaght's "Orb" quality sheet has been favourably known and recommended throughout the world since 1857 as a corrugated sheet of the highest quality. The perfection of galvanizing, the uniformity of gauge and corrugation is endorsed by universal specification. The properties and weights of coating are specially controlled to suit the wide range of applications of corrugated sheets and conform to the appropriate classification of Australian Standard Specification A.20-1947.

BLUE ORB BRAND.

LYSAGHT
ORB
AUSTRALIA

This universally known sheet has a uniformly heavy zinc coating applied to a ductile steel base of the highest quality. It is particularly suitable for applications requiring curving.

RED ORB BRAND.

LYSAGHT
ORB
AUSTRALIA
NOT FOR CURVING

Red Orb sheets carry the same high grade coatings as Blue Orb, but an especially hard sheet is used as a base. The extreme rigidity and stiffness specially recommends it for applications such as roofing, walling, or fencing, where maximum strength is required. This quality is available in 24 and 26 gauges, and is not suitable for curving.

ZINCANNEAL SHEETS.—Zincanneal quality sheets are an outstanding Lysaght development. By suitable high temperature treatment zinc is combined with the steel base to form a zinc-iron alloy having remarkable properties as a coating. Painting can be carried out immediately on erection without priming or fear of subsequent peeling. The resistance to atmospheric corrosion is particularly good, and excellent service is being obtained under severe conditions such as those met with in coastal locations.

BLUE Z.A. BRAND.

LYSAGHT
ZINCANNEAL
AUSTRALIA

This quality has the Zincanneal coating applied to a high quality ductile steel base, and may be curved with ease.

RED Z.A. BRAND.

LYSAGHT
ZINCANNEAL
AUSTRALIA

This quality is similar in all respects to the Blue Zincanneal with the exception of the steel base. An especially hard sheet base provides great rigidity and strength for structural application such as roofing, walling, and fencing, where these properties are of major importance. Red Zincanneal is not suitable for curving.

PRODUCTS SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 1833

10-3 INCH CORRUGATIONS STEEL SHEET GALVANIZED AND ZINCANNEAL

APPROXIMATE WEIGHT PER SHEET IN LBS.

Gauge	Length							
	5'	6'	7'	8'	9'	10'	11'	12'
18	32.06	38.40	44.75	51.09	57.44	63.78	70.13	76.47
20	25.97	31.11	36.25	41.39	46.53	51.67	56.81	61.95
22	21.04	25.20	29.36	33.53	37.69	41.86	46.02	50.18
24	17.01	20.38	23.74	27.11	30.48	33.84	37.21	40.58
26 Commercial	11.47	13.74	16.01	18.28	20.55	22.82	25.09	27.36

APPROXIMATE COUNT OF SHEETS PER HALF-TON CASE

Gauge	Length							
	5'	6'	7'	8'	9'	10'	11'	12'
18	35	29	25	22	20	18	16	14
20	43	36	31	27	24	22	20	18
22	53	44	38	34	30	27	25	23
24	68	57	49	43	38	34	31	29
26 Commercial	97	81	69	61	54	49	44	41

COVERAGE—MEAN AREA OF SURFACE COVERED BY 1 TON OF SHEET WITH 1½ CORRUGATIONS SIDE LAP AND 6" END LAP

Gauge	Length							
	5'	6'	7'	8'	9'	10'	11'	12'
18	788	800	808	815	820	824	827	830
20	972	987	998	1006	1012	1017	1021	1024
22	1200	1219	1232	1242	1249	1255	1260	1265
24	1484	1507	1524	1536	1545	1553	1559	1564
26 Commercial	2202	2235	2259	2277	2292	2303	2312	2320

26 GAUGE (Commercial).

COST—ESTIMATE OF COST PER 100 SQUARE FEET

Cost Per Ton	Length							
	5'	6'	7'	8'	9'	10'	11'	12'
£30	27/3	26/10	26/7	26/4	26/2	26/1	25/11	25/10
£31	28/2	27/9	27/6	27/3	27/1	26/11	26/10	26/9
£32	29/1	28/8	28/4	28/1	27/11	27/9	27/8	27/7
£33	30/–	29/6	29/3	29/–	28/9	28/8	28/7	28/6
£34	30/11	30/5	30/1	29/10	29/8	29/6	29/5	29/4
£35	31/9	31/4	31/–	30/9	30/6	30/5	30/3	30/2
£36	32/8	32/3	31/10	31/8	31/5	31/3	31/2	31/–
£37	33/7	33/1	32/9	32/6	32/3	32/2	32/–	31/11
£38	34/6	34/–	33/8	33/4	33/2	33/–	32/10	32/9
£39	35/5	34/11	34/6	34/3	34/–	33/10	33/9	33/8
£40	36/4	35/9	35/5	35/2	34/11	34/9	34/7	34/6

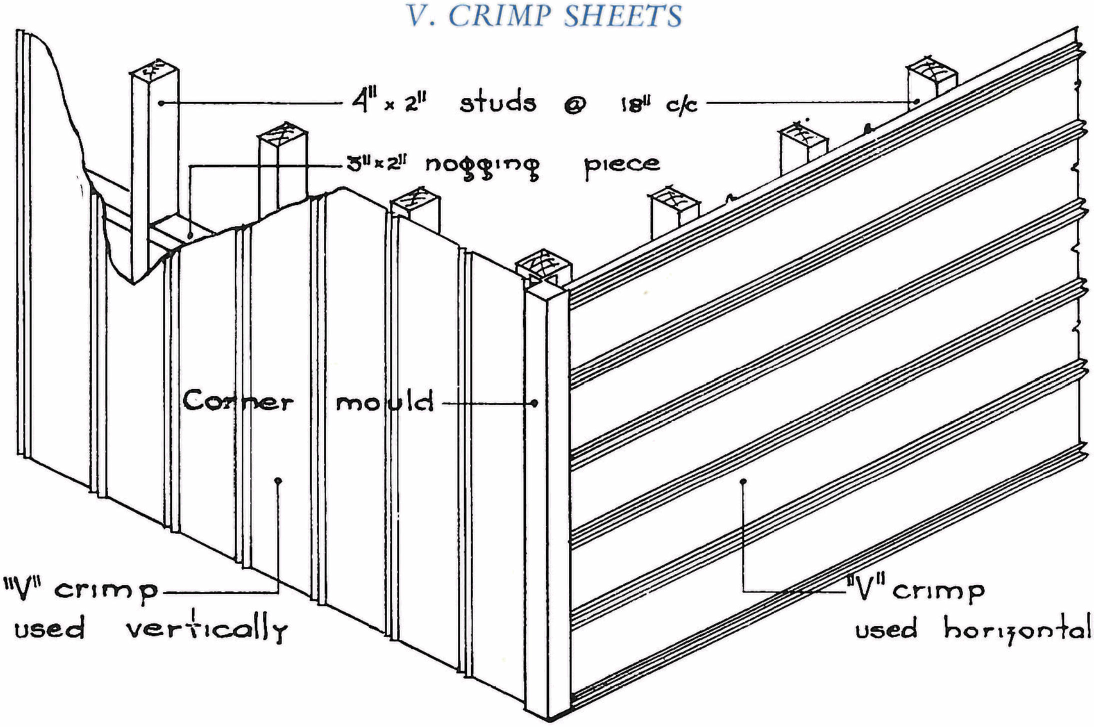
24 GAUGE.

COST—ESTIMATE OF COST PER 100 SQUARE FEET

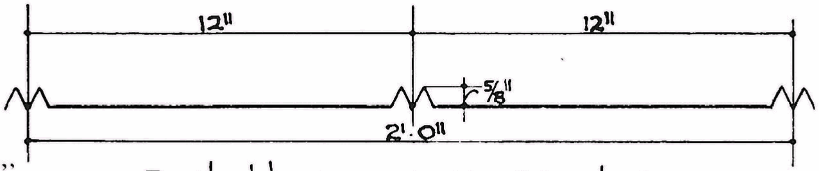
Cost Per Ton	Length							
	5'	6'	7'	8'	9'	10'	11'	12'
£30	40/5	39/10	39/4	39/1	38/10	38/8	38/6	38/4
£31	41/9	41/2	40/8	40/4	40/2	39/11	39/9	39/8
£32	43/2	42/6	42/–	41/8	41/5	41/3	41/–	40/11
£33	44/6	43/9	43/4	42/11	42/9	42/6	42/4	42/2
£34	45/10	45/2	44/7	44/3	44/–	43/9	43/7	43/6
£35	47/2	46/6	45/11	45/7	45/4	45/1	44/11	44/9
£36	48/6	47/9	47/3	46/10	46/7	46/4	46/2	46/–
£37	49/10	49/1	48/7	48/2	47/11	47/8	47/6	47/4
£38	51/2	50/5	49/10	49/6	49/2	48/11	48/9	48/7
£39	52/7	51/9	51/2	50/9	50/6	50/3	50/–	49/10
£40	53/11	53/1	52/6	52/1	51/9	51/6	51/4	51/2

NOTE.—Following long-established British practice, 26 gauge Galvanized Iron, both corrugated and plain, manufactured in Australia, is lighter than true 26g. It has provided an adequate and economical sheet which has been universally accepted for many years. In the above tables it is described as 26 gauge Commercial.

V. CRIMP SHEETS

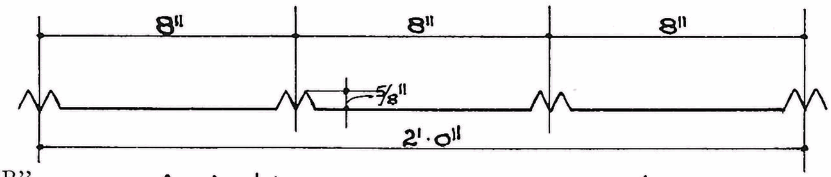


V CRIMP USED FOR HORIZONTAL AND VERTICAL SHEETING



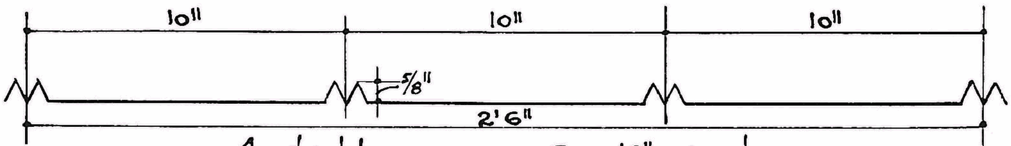
TYPE "C"

3 double crimps @ 12" centres



TYPE "B"

4 double crimps @ 8" centres



TYPE "A"

4 double crimps @ 10" centres

PRODUCTS SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 1931

STEEL WEATHERBOARDS

GENERAL.—Steel Weatherboards have been manufactured to provide the market with a shaped walling sheet of popular design having all the advantages of the strength and fire resistance of steel. The accuracy of shape adds to the pleasing appearance.

MATERIAL.—The Weatherboards are made from Lysaght's first quality Zincanneal sheets, with their well-known forming characteristics. The resistance of Zincanneal to atmospheric corrosion is particularly good, and excellent service is obtained under the severe conditions in coastal locations. These sheets can be painted immediately without any priming coat.

DATA ON SHEETS.

Lengths	6, 7, 8, 9, 10, 11, 12 feet
Overall depth	8¾"
Depth of coverage	8"
Width of board (back to front)	5/16"
Gauge of material	24g.
Weight per ft. run (lb.)	0.94

PACKING.—Sheets are sold by the case, each case containing 100 boards.

FIXING.—Boards are fixed to wood or slotted light steel section studs by 1" clouts. These are concealed by the succeeding board or the next board placed, clouts being spaced to suit studs. Boards can be fixed to light steel members by Nettlefolds, Parker-Kalon self-tapping screws (No. 4 round-headed screws are recommended for 24g. sheet).

LAPS.—Boards can be supplied notched, but most users prefer to carry out the notching on the building location with an ordinary hacksaw, using a blade of about 32 teeth to the inch, this cutting operation being just as easy as cutting a timber board.

Laps can take place in between studs, and it is not necessary for boards to end on a stud.

This lap should be 3 inches minimum, and the sheet, as shown overleaf, is notched preferably some 3½ inches. To reduce any tendency to open along joints by buckling self-tapping screws can be used on these side laps.

MOULDINGS.—Suitable corner, window frame, door frame, and weather mouldings can be designed to suit individual tastes, all made from Lysaght's Zincanneal R.L. sheets. Typical mouldings are illustrated overleaf.

Mouldings are either 6 feet or 8 feet long, dependent as a rule on the length of sheet from which they are made and/or the length of the folding press in which they are formed. Moulds can be in two sizes (one slightly smaller than the other) so that small moulds will just fit inside larger moulds. Alternatively the mould can be folded with a slight taper for joining purposes.

Top and bottom plate moulds are not essential. The top edge of the top board can be bent over and nailed to the top plate. This is finished off with ¼" round beading between the steel Weatherboard and eave soffit. The bottom board can be cut and bent under the bottom plate.

DETAILS OF CASES—100 BOARDS PER CASE

Length in Feet	6'	7'	8'	9'	10'	11'	12'
Overall dimensions—length	6' 2½"	7' 2½"	8' 2½"	9' 2½"	10' 2½"	11' 2½"	12' 2½"
—width	11"	11"	11"	11"	11"	11"	11"
—height	2' 0¼"	2' 0¼"	2' 0¼"	2' 0¼"	2' 0¼"	2' 0¼"	2' 0¼"
Weight of case full—cwt. qr. lbs.	4 : 2 : 4	5 : 1 : 5	6 : 0 : 5	6 : 3 : 6	7 : 2 : 7	8 : 1 : 8	9 : 0 : 8
Coverage per case (100 boards) in sq. ft.	389	456	522	589	656	722	789

COST—ESTIMATE OF COST PER 100 SQUARE FEET—3" END LAP—MEAN COVERAGE VALUE

Cost per Case—100 Boards	6'	7'	8'	9'	10'	11'	12'
£ 8	41/2	35/1	—	—	—	—	—
£ 9	46/3	39/6	—	—	—	—	—
£10	51/5	43/10	38/4	—	—	—	—
£11	56/7	48/3	42/2	—	—	—	—
£12	61/8	52/8	46/–	40/9	—	—	—
£13	66/10	57/–	49/10	44/2	—	—	—
£14	72/–	61/5	53/8	47/6	42/8	—	—
£15	77/1	65/9	57/6	50/11	45/9	—	—
£16	82/3	70/2	61/4	54/4	48/9	44/4	—
£17	—	74/7	65/2	57/9	51/10	47/1	—
£18	—	78/11	69/–	61/1	54/10	49/10	45/8
£19	—	—	72/10	64/6	57/11	52/8	48/2
£20	—	—	76/8	67/11	61/–	55/5	50/8
£21	—	—	—	71/4	64/–	58/2	53/3
£22	—	—	—	74/8	67/1	60/11	55/9
£23	—	—	—	—	70/1	63/8	58/4
£24	—	—	—	—	73/2	66/6	60/10
£25	—	—	—	—	—	69/3	63/4
£26	—	—	—	—	—	72/–	65/11
£27	—	—	—	—	—	—	68/6
£28	—	—	—	—	—	—	71/–

NOTE.—In using these figures it must be remembered that the price per case varies with the length, i.e., in comparing costs per square, a typical example might be when sheets are being sold:—

6ft.—£12 per case—61/8 per square.
9ft.—£18 per case—61/1 per square.
12ft.—£24 per case—60/10 per square.

LYSAGHT'S
COUNTRY SERVICE

BUILDING INFORMATION

LYSAGHT
ORB
AUSTRALIA

JOHN LYSAGHT (AUST.) PTY. LTD.

FOREWORD

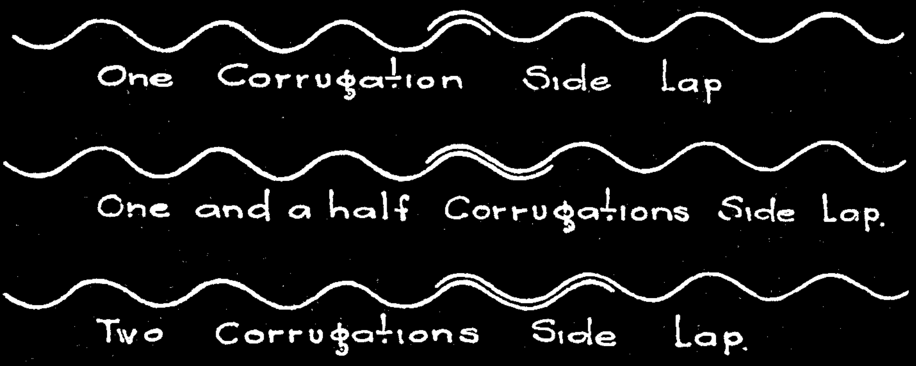
Recent developments in methods of construction, and the perfection of new materials has influenced the design and construction of buildings generally. The application of zinc coated sheets to an infinite number of constructional and decorative finishes has led to a wide interest as to the easiest and most correct methods of fixing Lysaght's steel sheets.

As is well known, Corrugated Sheet Steel is produced in three pitches of corrugations, 5", 3" and 1", the 1" corrugation sheet being sometimes referred to as ripple iron. The 3" pitch is that in most common use, and is produced in two widths 10 x 3" corrugations and 8 x 3" corrugations. 10 x 3" corrugations is used universally in buildings of all descriptions for both roofing and vertical sheeting, while 8 x 3" corrugations sheet is mainly used for tanks or where curving is required. Sheets are produced in lengths of from 5' to 12' and in gauges 18 to 26. 3" pitch is manufactured in both Galvanized and Zincanneal finishes, Red Orb and Red Zincanneal being particularly applicable for roofing and siding.

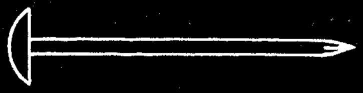
In this Building Information Section of the Country Service Manual we have endeavoured to illustrate those methods of construction and fixing which are considered most applicable to those structures that are portrayed in other Sections of the Country Service Manual, and is especially designed to help the man on the land who proposes to erect his own structures.

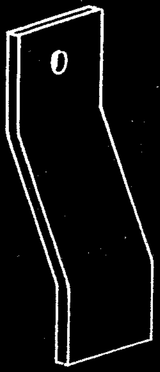
While the technical information detailed in this Brochure has been compiled from various sources, we feel that our knowledge can be greatly augmented by continuous contributions from readers in all States. If you should encounter any particular problem in the erection of a building we would be pleased if you would make use of Lysaght's Building Advisory Service and contact us at the first opportunity. We look forward to any suggestions or criticisms that you may have in order that revision of future Brochures of this nature will be complete.

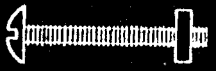
STANDARD ROOF FIXINGS

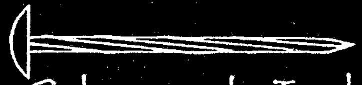

One Corrugation Side Lap
One and a half Corrugations Side Lap.
Two Corrugations Side Lap.

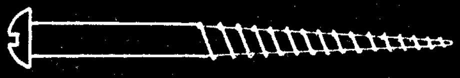
STANDARD SIDE LAPS FOR ROOF SHEETING

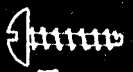


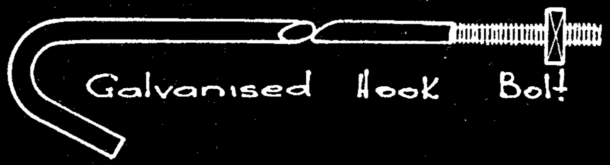


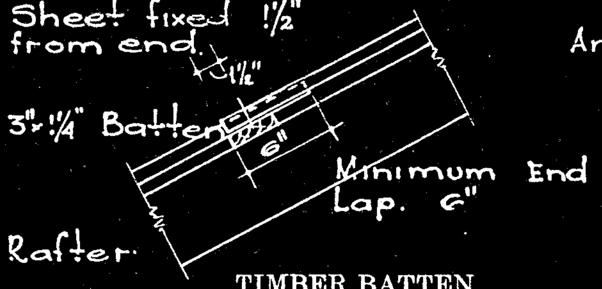




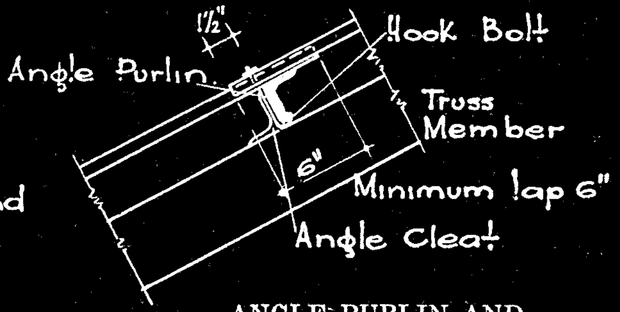








TIMBER BATTEN CONSTRUCTION



ANGLE PURLIN AND HOOK BOLT CONSTRUCTION

BUILDING
INFORMATION

LYSAGHT'S
COUNTRY SERVICE

SHEET 3111

STANDARD ROOF FIXINGS

GENERAL.—Methods of fixing corrugated steel sheet are very simple and the fittings depicted overleaf are the most important in common usage. Shown in diagramatic form are typical details of fixing to steel and timber members.

SIDE LAPPING OF CORRUGATED SHEETS.—When a corrugated sheet is placed flat and observed, it will be found that there are a number of crests and hollows. If these are counted there will be found to be more of one than the other. If there are more crests than hollows, then the sheet is the "right way" up. This side of the sheet should be bearing the Lysaght Brand.

Sheets are said to be lapped one corrugation when both sheets are laid the right way up, and as illustrated overleaf, the crest of one sheet fits over the crest of the other sheet. This lap is used for covering walls, or for roofs in dry areas.

Sheets are said to be lapped one and a half corrugations when sheets are laid with every second one upside down, and with one crest and one hollow of each sheet matched. This is the standard lap for roofs. It is only used for wall sheeting where special protection from driving rain is required.

Sheets are said to be lapped two corrugations when two crests and one hollow of each sheet are matched, both sheets being the right way up. The following Table shows details of sheet sizes and coverages for the various side laps.

LAP	COVERAGE	
	10 x 3" Corrugations Steel Sheet Overall width 2' 7½"	8 x 3" Corrugations Steel Sheet Overall width 2' 1½"
Lapped one corrugation ..	2' 6"	2' 0"
Lapped one and one half corrugations ..	2' 4½"	1' 10½"
Lapped two corrugations ..	2' 3"	1' 9"

FIXING OF SHEETS.—Sheets are fixed as follows:—

1. Roof sheets are fixed through the top of every second corrugation at ends of sheets and every third corrugation at intermediate fixings.
2. Wall sheets are fixed through the top of every third corrugation at end fixings and every fourth corrugation at intermediate fixings.
3. Where sheets span more than 3' between battens or purlins it is advisable to fix the side lap at an intermediate point with a self tapping screw or gutter bolt.

FIXING TO WOODEN MEMBERS.—Sheets are fixed to wooden members, i.e., battens or purlins, with galvanized roofing nails or galvanized screws and washers.

FIXING TO STEEL MEMBERS.—Sheets are fixed to steel members with galvanized hook bolts, siding clips or toe clips with gutter bolts.

GALVANIZED ROOFING NAILS.—Galvanized roofing nails are manufactured in lengths of 2" and 2¼" They are normally purchased by the cwt. from manufacturers, but may be purchased by the lb. in small quantities. For estimating purposes it may be assumed that a one lb. packet of 2¼" contains 100 nails, and that approx. 70 nails are required for one square of roofing. Galvanized roofing nails are the most suitable for fixing roofing sheets to hardwood roof timbers.

GALVANIZED TWISTED SHANK ROOFING NAILS.—Galvanized twisted shank roofing nails are similar to the standard roofing nail with the exception that the shank has been twisted in order to obtain a better grip in the timber roof members. They are manufactured in lengths of 2" and 2¼" and are normally used where the roof timbers are oregon or cypress. These nails are purchased by the cwt. from the manufacturers but can be obtained from local hardware stores in 1 lb. lots. Approximately 70-2¼" roofing nails weigh 1 lb.

GALVANIZED ROOFING SCREWS.—Galvanized roofing screws are normally used in the softer roofing timbers such as oregon and cypress. They are manufactured to the size and gauge shown in the Table below. These screws are wrapped in 7 lb. parcels by the manufacturers but may be purchased in 1 lb. lots. Screws are used in conjunction with lead washers, one per roofing screw. For estimating purposes, 70 screws and washers are required per 100 sq. ft. of roofing. The most common sizes are:—

1¾"—56 screws per lb., or 1¼ lbs. per square of roofing.
2"—50 screws per lb., or 1.4 lbs. per square of roofing.

1½" galvanized roofing screws should not be used for fixing of 3" corrugated sheet, as they will not give sufficient grip in the timber batten or purlin. It is recommended that the minimum size screw to be used be 2".

If a lead washer is used it should always be accompanied by a steel washer. An alternative method is to use a malthoid diamond washer in conjunction with a galvanized metal washer.

APPROXIMATE NUMBER OF SCREWS PER CWT.

Length	SCREW GAUGE					
	10 W.G.		12 W.G.		14 W.G.	
	Gross	Doz.	Gross	Doz.	Gross	Doz.
1½"	62	11	48	11	35	9
1¾"	—	—	43	1	31	2
2"	—	—	39	5	29	2
2¼"	—	—	34	—	27	—
2½"	—	—	30	9	24	4

GALVANIZED HOOK BOLTS.—Galvanized hook bolts are used in a variety of shapes to fix corrugated steel sheet to steel structural members, the chief type being shown overleaf. These are available in lengths from 4" to 6". For estimating purposes it may be assumed that 6 dozen hook bolts are required for each square of roofing.

GUTTER BOLTS.—Gutter bolts and nuts are provided in ¾" and 1" sizes and are used for fixing sheets in conjunction with siding and toe clips, for fixing side laps, ventilating ridge, gutter brackets, etc.

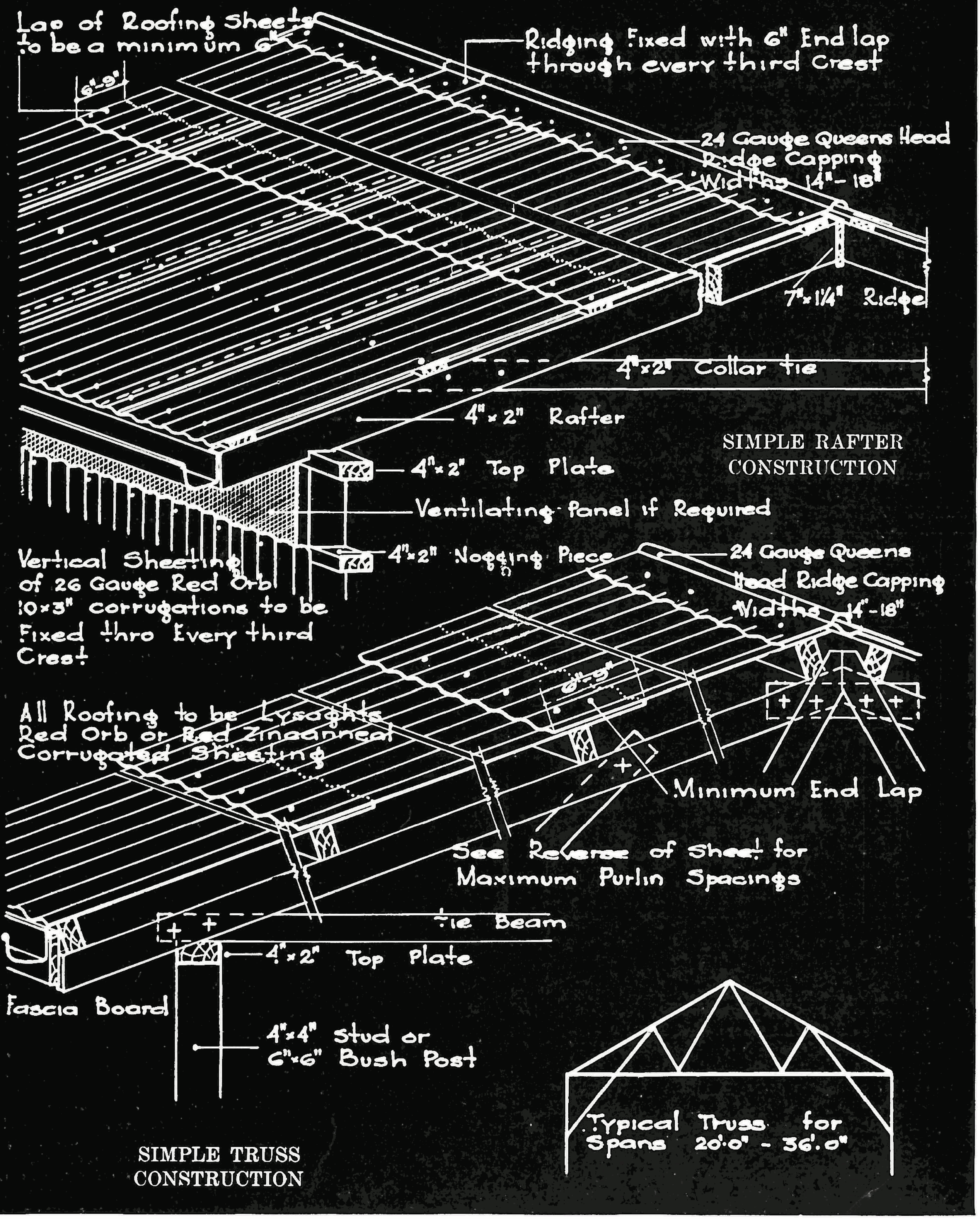
SIDING CLIPS AND TOE CLIPS.—Toe clips are very similar to the siding clip illustrated overleaf. They are made from ¾" wide strips of 12g. galvanized sheet formed to suit size of angle iron, purlin or girt. Clips are fixed to sheets with 1" x ¼" dia. sheet bolts (gutter bolts). These are obtained by the dozen from hardware stores.

SELF TAPPING SCREWS.—Self tapping screws are used for joining one sheet to another and form a convenient method of fixing the side lap of roofing sheets at an intermediate point. Of the wide range of sizes available ⅜" and ½" are most suited for normal roofing sheets.

END LAPPING.—As illustrated in the two sketches overleaf, sheets are end lapped a minimum of 6". To obtain the fullest advantage of this lap, nails or screws are fixed through the sheet 1½" in from the end of the overlapping sheet.

NOTE.—A Corrugated Iron roof will last longer if the end and side laps of the sheets are painted before fixing with any good quality roof paint. The points of contact are where corrosion usually begins.

CORRUGATED IRON AND ZINCANNEAL SHEET ROOFS


Lap of Roofing Sheets to be a minimum 6"
6'-9"
Ridging Fixed with 6" End lap through every third Crest
24 Gauge Queens Head Ridge Capping Widths 14"-18"
7"x1¼" Ridge
4"x2" Collar tie
4"x2" Rafter
SIMPLE RAFTER CONSTRUCTION
4"x2" Top Plate
Ventilating Panel if Required
4"x2" Nogging Piece
Vertical Sheeting of 26 Gauge Red Orb 10x3" corrugations to be Fixed thro Every third Crest
24 Gauge Queens Head Ridge Capping Widths 14"-18"
All Roofing to be Lysaghts Red Orb or Red Zincanneal Corrugated Sheeting
6'-9"
Minimum End Lap
See Reverse of Sheet for Maximum Purlin Spacings
Tie Beam
4"x2" Top Plate
Fascia Board
4"x4" Stud or 6"x6" Bush Post
Typical Truss for Spans 20'0" - 36'0"
SIMPLE TRUSS CONSTRUCTION

BUILDING INFORMATION

LYSAGHT'S COUNTRY SERVICE

SHEET 3112

CORRUGATED IRON AND ZINCANNEAL SHEET ROOFS

FIXING DETAILS

GENERAL.— Types of simple roof construction required for small structures are illustrated overleaf. Simple rafter construction is used for spans up to 24'; and truss construction as shown, for buildings requiring a clear span of 20' to 40'.

All roof sheeting used for construction of roofs shall be of 26g. 10-3" corrugations Red Orb or Red Zincanneal sheet. All nails, screws, fixings, etc., shall be galvanized.

All sheet metal used in the manufacture of ridging, spouting, gutters, linings, flashings, etc., shall be of Queen's Head Galvanized or Zincanneal R.L. flat sheet.

SIMPLE RAFTER CONSTRUCTION.— In general, roofs of normal spans are framed up in:—

4" x 2" rafters at not more than 3' centres.
7" x 1¼" ridging.
4" x 2" collar ties.

Rafters, however, vary in size according to the span as shown in the table below, are spiked to 7" x 1¼" ridging and birdsmouthed over 4" x 2" top plates. Rafters are spiked to top plates and secured where necessary with 26g. galvanized iron strapping.

When rafters are spaced at 3' centres, 4" x 2" collar ties should be fixed to every second pair of rafters at approximately mid-points. If rafters are spaced 18"-24" apart, ties should be fixed to every third pair of rafters. 3" x 1¼" battens are fixed at not more than 4' 6" centres for fixing of corrugated sheet.

SIZE OF RAFTERS FOR CORRUGATED IRON ROOFS

Spacing (inches)	Distance between supports (feet)	Supported at ends only.		Continuous over three or more supports	
		Hardwoods (inches)	Pine & Softwoods (inches)	Hardwoods (inches)	Pine & Softwoods (inches)
24	6	3 x 1½	3 x 2	3 x 1½	3 x 2
24	8	3 x 2	4 x 2	3 x 1½	4 x 2
24	10	4 x 2	5 x 2	3 x 1½	4 x 2
24	12	5 x 2	6 x 2	4 x 1½	5 x 2
30	6	3 x 1½	3 x 2	3 x 1½	3 x 2
30	8	4 x 1½	4 x 2	3 x 1½	4 x 2
30	10	4 x 2	5 x 2	3 x 2	4 x 2
30	12	5 x 2	6 x 2	4 x 1½	5 x 2
36	6	3 x 1½	3 x 2	3 x 1½	3 x 2
36	8	4 x 1½	4 x 2	3 x 1½	4 x 2
36	10	5 x 1½	5 x 2	4 x 1½	5 x 2
36	12	6 x 2	6 x 2	4 x 2	6 x 2
48	6	3 x 1½	—	3 x 1½	—
48	8	4 x 1½	—	4 x 1½	—
48	10	5 x 2	—	5 x 2	—
48	12	6 x 2	—	5 x 2	—

NOTE.—The above sizes of timbers are calculated for group A and B timber of standard grade.

SIMPLE TRUSS CONSTRUCTION.—Where span exceeds 24', it will be necessary to frame up a simple truss constructed of 4" x 2" hardwood members bolted together with ½" bolts with square washers.

Trusses of this type are usually spaced 10'-12' centres so that each truss bears on 4" x 4" hardwood studs or 6" dia. bush posts.

For 26g. Red or 24g. Blue Orb corrugated sheet purlins are spaced at not more than 4' 6" centres and secured to top chord of truss with 2" x 2" timber cleats to prevent over-turning. For heavier gauges of roofing iron, purlin spacing may be increased proportionately.

SIZE OF PURLINS FOR CORRUGATED IRON ROOFS

Spacing (inches)	Span (feet)	Supported at ends only		Continuous over three or more supports	
		Hardwoods (inches)	Pines & Softwoods (inches)	Hardwoods (inches)	Pines & Softwoods (inches)
30	10	4 x 2	5 x 2	3 x 2	4 x 2
30	12	5 x 2	6 x 2	4 x 1½	5 x 2
30	14	6 x 2	7 x 3	5 x 1½	6 x 2
36	10	5 x 1½	5 x 2	4 x 1½	5 x 2
36	12	6 x 2	6 x 2	4 x 2	6 x 2
36	14	6 x 3	7 x 3	5 x 2	6 x 3
42	10	5 x 1½	6 x 2	4 x 1½	5 x 2
42	12	6 x 2	6 x 3	5 x 1½	6 x 2
42	14	6 x 3	7 x 3	5 x 2	6 x 3
48	10	5 x 2	—	4 x 2	—
48	12	6 x 2	—	5 x 2	—
48	14	6 x 3	—	6 x 2	—

ROOF PITCH.— It will be found that a pitch of from 1 in 6 to 1 in 4 will be most satisfactory and pleasing in appearance. The lower the pitch the greater the lap of the corrugated sheets required.
It is recommended that the minimum pitch of a roof where more than a single sheet is used should not be less than 1' rise in 12' going. Should this minimum pitch be used, it is necessary to lap sheets 9" at ends and with two corrugations side lap. Where a minimum slope is used or where purlin or batten spacing exceed 4' centres, gutter bolts or self tapping screws should be used on the side laps to ensure a waterproof lap.

ROOF SHEETING.— Pitched roofs shall be covered with 26g. 10-3" corrugations Red Orb Galvanized Iron or Red Zincanneal corrugated sheets, fixed with side lap of 1½ corrugations and a minimum end lap of 6". Sheets shall span at least two battens or purlin spacings and shall be secured to hardwood or pine battens or purlins with spring-headed roofing nails (or galvanized screws and washers) pierced through the top of every second corrugation at the end of sheets and every third corrugation on intermediate battens or purlins. All fixing, whether spring-headed roofing nails or galvanized screws and washers, should be at a distance of 1½" from the ends of sheets.

RIDGE CAPPING.— Ridge capping is to be formed to standard section from 14"-18" wide strips of 24g. "Queen's Head" or Zincanneal flat sheets, in 6' or 8' lengths. Ridge capping is fixed on top of, and in conjunction with the corrugated roofing sheets with spring-headed roofing nails pierced through the crest of every second corrugation. Ridge capping is to be dressed well down into the troughs of the corrugated sheets.

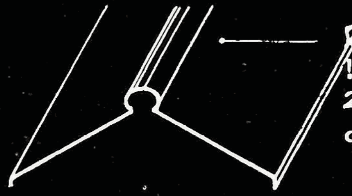
EAVES GUTTERS.— Eaves gutters shall be 4½" or 5" beaded edge quadrant type formed from "Queen's Head" galvanized iron or Zincanneal in 6' or 8' lengths, fixed in position with required falls to outlets, lapped 1½", double rivetted, soldered at joints, and secured to foot of rafters or fascia boards with 16g. galvanized brackets at intervals of approximately 3'. Cut gutters to receive thimble connection of downpipes and properly solder at these junctions. Provide galvanized Crimp wire gratings at all downpipe outlets.

SOLDER.—Where soldered joints are specified, all joints are to be wiped dry before soldering. Solder shall be of the best grade and shall consist of 50/50 tin and lead. 60/40 is sometimes preferred for Zincanneal.

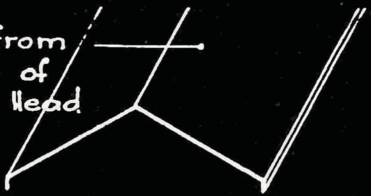
NOTE.—A Corrugated Iron roof will last longer if the end and side laps of the sheets are painted before fixing with zinc dust paint, red oxide, or any good quality roof paint. The points of contact are where corrosion usually begins.

LYSAGHT'S COUNTRY SERVICE

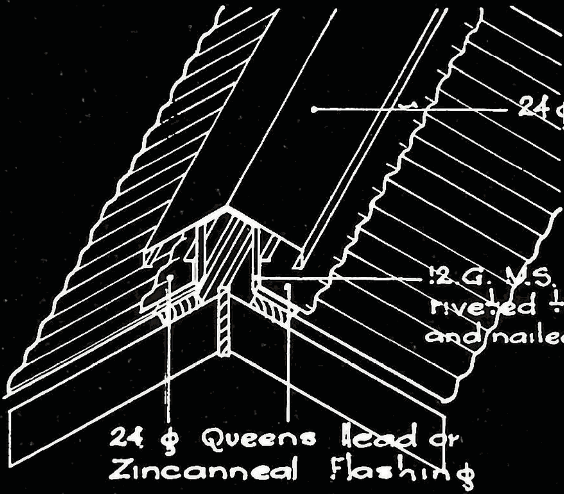
RIDGE CAPPING — VENTILATING RIDGING


Ridging formed from 14"- 18" wide strips of 24 gauge Queens Head or Zincanneal

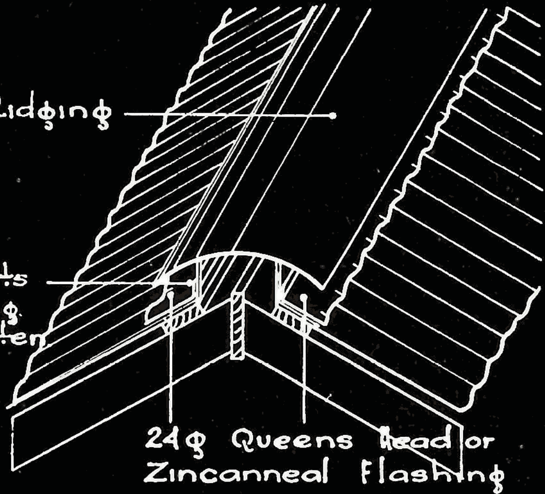
STANDARD RIDGE CAPPING



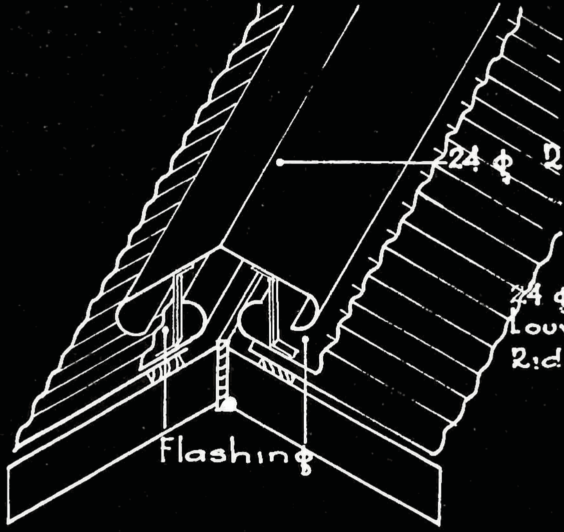
PLAIN RIDGE CAPPING


24 gauge Ridging
12 G. M.S. Brackets riveted to ridging and nailed to batten
24 g Queens Head or Zincanneal Flashing

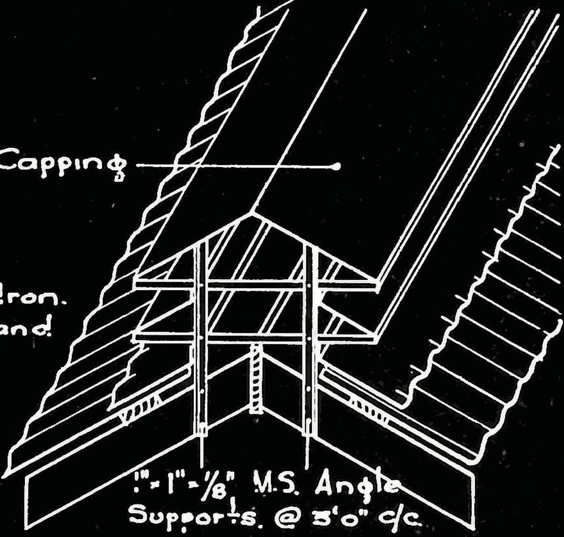
VENTILATING RIDGE
TYPE 1



VENTILATING RIDGE
TYPE 2



VENTILATING RIDGE
TYPE 3



VENTILATING RIDGE
TYPE 4

BUILDING INFORMATION

LYSAGHT'S COUNTRY SERVICE

SHEET 3121

RIDGE CAPPING — VENTILATING RIDGE

GENERAL.— To ensure correct finish to the ridge of a roof it is necessary to use either:—

(a) Ridge Capping, or

(b) Ventilating Ridge.

Overleaf are illustrated the most common forms of Ridge Capping and Ventilating Ridges. The selection of the type to be used, will depend on the type of building and the necessity or otherwise of ensuring the maximum amount of ventilation.

All materials used for forming Ridge Capping or Ventilating Ridging shall be 24g. "Queen's Head" Flat Galvanized Iron or Zincanneal R.L. Sheet.

STANDARD RIDGE CAPPING.— Standard Ridge Capping (Ridge Capping with roll) should be formed to the pattern as shown in Australian Standard Specification, No. SPR3-1931, it will be found, however, that manufacturers in the various States may depart slightly from the standard pattern, but in the main the variation will be slight, and is available in sizes of from 14"-18". When ordering various sizes of Ridge Capping, it should be noted that the size referred to is the width of the flat sheet from which the ridging is formed. The most popular sizes are 14"-18", the 18" standard Ridge Capping being used mainly for domestic construction, 14"-16" being used for small sheds such as country farm structures.

Standard Ridge Capping shall be of 24g. "Queen's Head" Galvanized Iron or Zincanneal sheet formed from the required width of sheet in 6' or 8' lengths and shall be securely fixed in conjunction with the roofing sheets with galvanized screws and lead washers, or specially twisted galvanized roofing nails pierced through the top of every second corrugation.

All Ridge Capping shall be fixed with an end lap of 6", fitted in conjunction with the roof and dressed well down into the corrugations.

This type of Ridge Capping is standard stock in all hardware stores.

PLAIN RIDGE CAPPING.— Where the local plumber makes up his own ridging, he normally forms it as a plain Ridge Capping without roll as indicated overleaf. This is prepared in lengths of 6' or 8' from 24g. "Queen's Head" or Zincanneal flat sheet and is applied to the roof in a similar manner as standard Ridge Capping.

VENTILATING RIDGES.— Where it is necessary to obtain the maximum amount of ventilation in a building, it will be found that the application of a Ventilating Ridge will assist the requisite flow of air. Where it is desired to bird proof ventilating ridges, $\frac{1}{2}$" galvanized wire mesh should be soldered to underside of Ridge Capping, taken down behind flashing and either soldered to flashing or fixed to roof batten.

The methods of fabrication and fixing are as follows:—

(a) Ventilating Ridge, Type 1.—Ventilating Ridge Type 1, is formed from plain Ridge Capping, 18"-24" in width of 24g. flat "Queen's Head" or Zincanneal R.L. Sheet, and is supported on 12g. M.S. brackets at 3' centres rivetted to ridge piece and is nailed to roof fixing battens. The height of these M.S. brackets is adjusted to ensure a minimum of 2" clear space above the top of the flashing to the underside of the ridge piece. Flashings where shown are to be from 9" wide strips of 26g. "Queen's Head" or Zincanneal R.L. Flat Sheet formed to shape and is to be rivetted to 12g. M.S. brackets and nailed to roof fixing batten through every second corrugation, well dressed down into the hollows. Care should be taken that the flashing extends at least 1" above the lower edge of the Ridge piece.

(b) Ventilating Ridge, Type 2.—This type of Ventilating Ridge is similar in fabrication and construction to Type 1 which has been previously specified in detail. Where plain Capping was used in Type 1 substitute an 18"-24" strip of "Queen's Head" or Zincanneal R.L. and curve to the required radius. Care should be taken that the edge of the ridge piece finishes a minimum of 1" below the top of the flashing. Flashings shall be from 9" wide strips of 26g. "Queen's Head" or Zincanneal R. L. flat sheet formed to shape and rivetted to 12g. M.S. brackets and nailed to roof fixing batten, through every second corrugation, well dressed down into hollows.

This type of Ventilating Ridge will appeal to those who are unable to procure the standard shape of Ridge Capping.

(c) Ventilating Ridge, Type 3.—Similar to Type 1, with the exception that ridge and flashing are specially rolled at edges to a 2" radius.

(d) Ventilating Ridge, Type 4.—Ventilating Ridge Type 4 may be described as a louvred type of Ventilating Ridge and is similar in construction to Type 1. The framework for this type of Ventilating Ridge is formed from 1" x 1" W.I. angles in both vertical and horizontal positions, to which the 24g. "Queen's Head" or Zincanneal flashings are rivetted. This type of Ventilating Ridge is suitable for larger size buildings.

NOTE.— A Corrugated Iron roof will last longer if the end and side laps of the sheets are painted before fixing with a god quality roof paint. Points of contact are where corrosion may commence.

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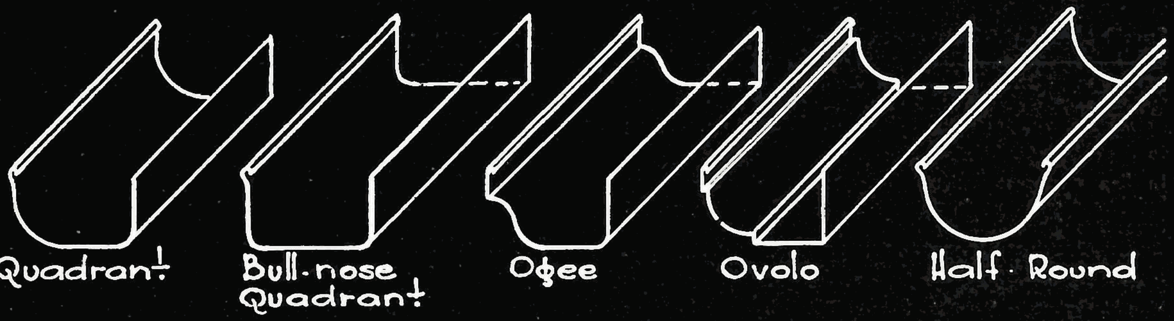
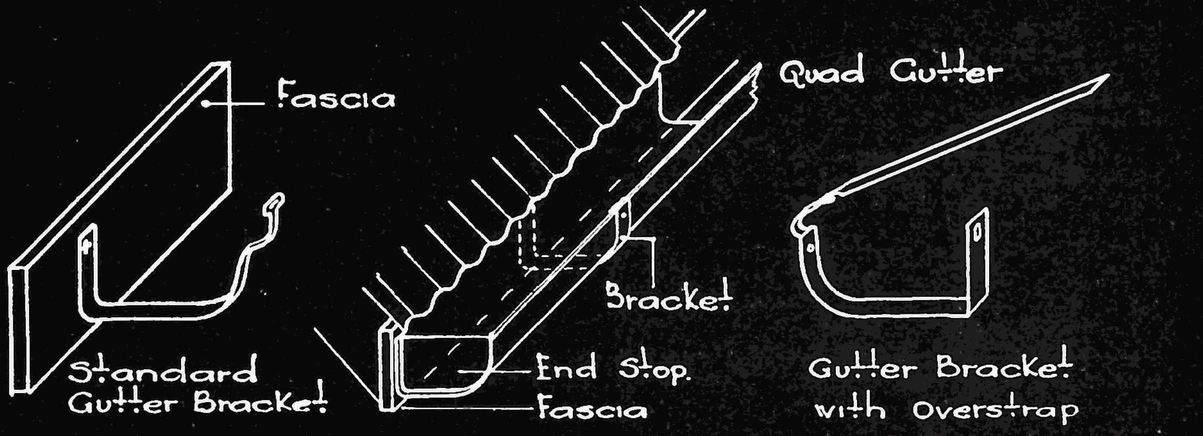
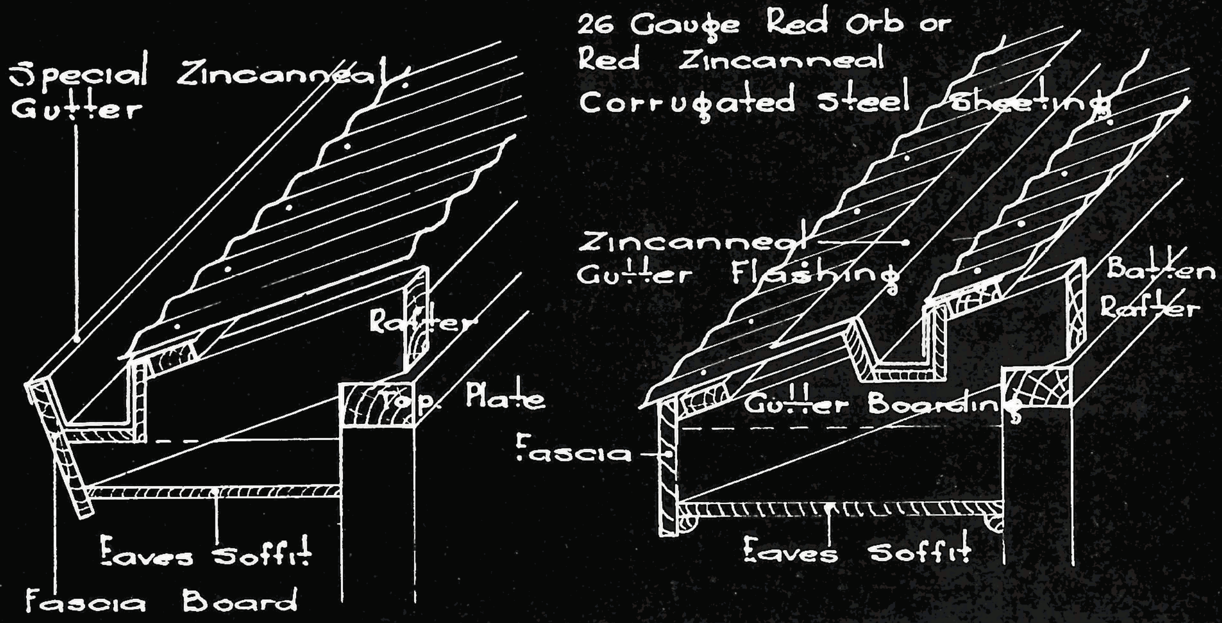
EAVES GUTTERS — SECRET GUTTERS





FIXING OF EAVES GUTTERS


Special Zincanneal Gutter
Rafter
Top Plate
Eaves Soffit
Fascia Board
26 Gauge Red Orb or Red Zincanneal Corrugated Steel Sheeting
Zincanneal Gutter Flashing
Batten
Rafter
Gutter Boarding
Fascia
Eaves Soffit

SECRET GUTTERS

BUILDING INFORMATION

LYSAGHT'S COUNTRY SERVICE

SHEET 3131

EAVES GUTTERS, SECRET GUTTERS

GENERAL.—The chief types of eaves gutters are illustrated overleaf. Most are obsolescent and with few exceptions common practice is to use the standard quadrant type. Though the shapes of this is set out in Australian Standard Specification SPR3-1931, a number of manufacturers still fabricate quadrant guttering (or spouting) to their own particular pattern.

Where replacements have to be made of small lengths of guttering to old buildings then the material is formed to a pattern conforming to the existing installation.

In lieu of eaves gutters many Architects and home builders prefer to use secret or hidden gutters. Suitable types are illustrated overleaf.

STANDARD EAVES GUTTERS (OR SPOUTING).—Eaves gutters of the type and size selected are formed from 24g. "Queen's Head" Galvanized or Zincanneal R.L. flat sheet in 6' or 8' lengths, fixed in position with required falls to outlets; lapped, double rivetted, and soldered at joints. Cut gutters to receive thimble connection of downpipes and properly solder at these junctions. Provide galvanized wire gratings at all downpipe outlets. Properly construct all stop ends, mitres, etc.

EAVES GUTTERS FIXINGS.—Eaves gutters can be fixed to the eaves with a variety of straps or brackets according to the method of fixing and type of bracket selected.

Brackets can be fixed:—

(a) To fascia boards with galvanized nails.

(b) To rafters with galvanized nails.

(c) In all steel constructions to corrugated roofing sheets with galvanized bolts, nuts and washers.

Brackets are formed from 16g. galvanized strip and fastened over or on to the guttering.

In general straps are bent over the lip. Alternatively to support the gutters against heavy snow or leaf loads, handling of gutters when cleaning, etc., an overstrap is provided, as illustrated, to fasten on to the rafters. Constructions exist using a distance tube and spike, or in which a bracket is rivetted or attached by a nut and washer to the guttering.

SIZE OF GUTTERS.—The size of the gutter necessary will depend upon the size and number of downpipes necessary to carry away the maximum rainfall from any given roof. This will be dealt with in Sheet No. 3141. The size of the gutter should be such that the entry of the downpipe will fit snugly into the bottom of the gutter and not project up the outer face. Galvanized Crimp wire gratings must be provided at all downpipe outlets.

SECRET GUTTERS.—Frame up for secret gutters as shown overleaf with 1" rough boarding, bottom boards being packed up to give a minimum fall of 1" in 40' towards the outlets. Gutter linings are to be formed of 24g. "Queen's Head" flat Galvanized Iron or Zincanneal sheets carefully folded to shape and laid on timber boarding.

Gutter linings are to extend up the pitch of the roof a distance of at least 3", giving a corrugated sheet lap of at least 3". Lining is to be finished off at the top edge with a bead.

Where the gutter is placed against the fascia the edge of the lining is to be dressed over the top of the fascia and nailed or screwed in position.

Where the lining at the lower end laps over the short roofing sheets, this lap is to be at least 6", the lining to be dressed into the corrugations and fixed in position in conjunction with the roofing sheets.

PAINTING.—The points of contact are where corrosion usually begins. Galvanized Iron and Zincanneal sheet will last longer if the end and side laps of the sheet are painted before fixing with zinc dust paint, red oxide, or any good quality roof paint.

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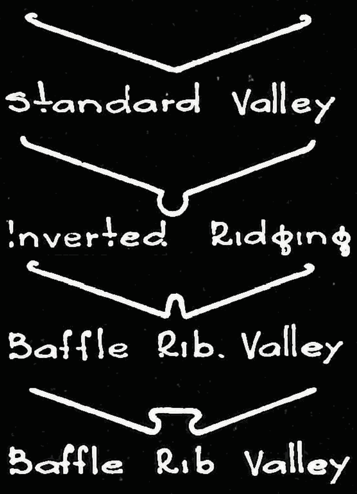
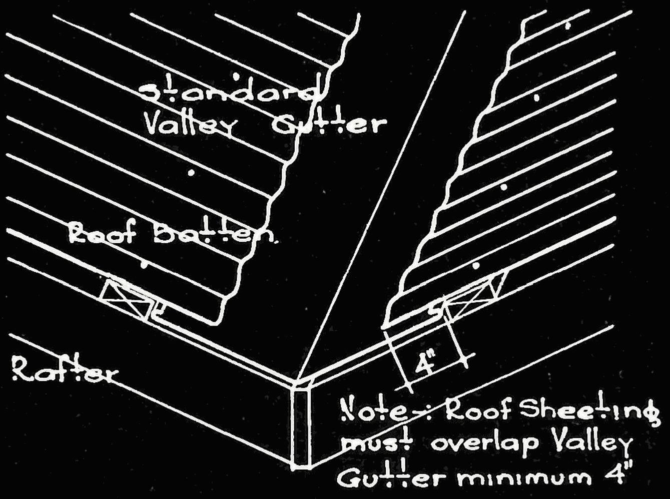
VALLEY GUTTERS — BOX GUTTERS — FLASHINGS

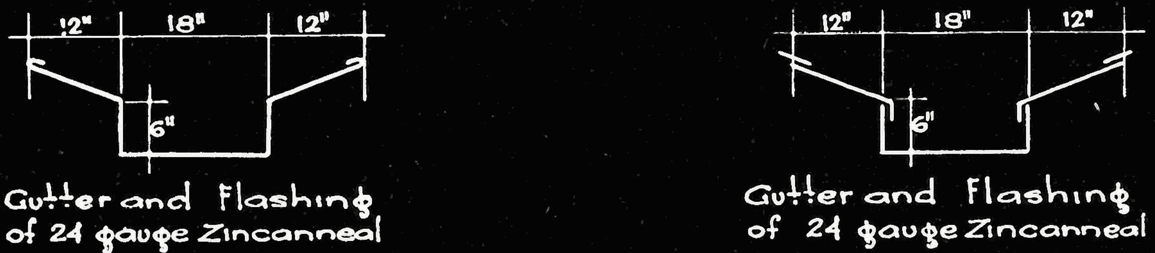


STANDARD TYPES OF VALLEY GUTTERS



Note:- Roof Sheeting must overlap Valley Gutter minimum 4"

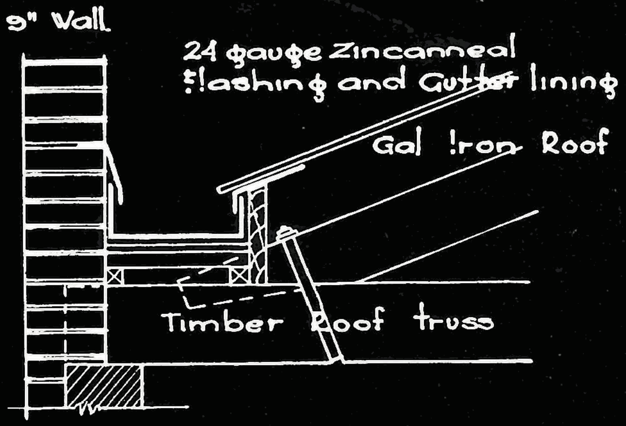
DETAIL OF VALLEY FIXING



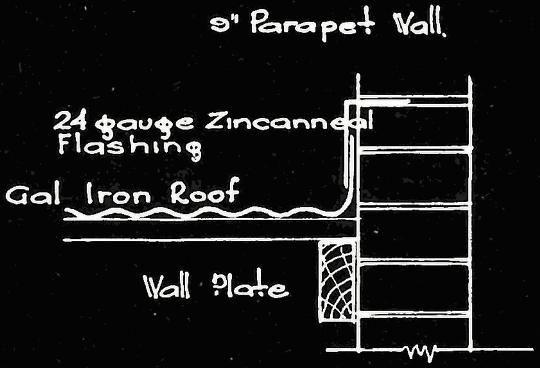
Gutter and Flashing of 24 gauge Zincanneal

Gutter and Flashing of 24 gauge Zincanneal

TYPICAL BOX GUTTERS



DETAIL OF BOX GUTTER FOR TIMBER TRUSS



FLASHING AGAINST PARAPET WALL

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BUILDING INFORMATION

LYSAGHT'S COUNTRY SERVICE

SHEET 3132

VALLEY GUTTERS, BOX GUTTERS, FLASHINGS, ETC.

GENERAL.—Overleaf are shown various details of valley gutters, box gutters, flashings, etc., such as will be required on the average building when constructed of corrugated steel sheets. Exact details and sizes may be varied to suit the individual taste, but in general, the methods and materials as described overleaf are standard practice.

VALLEY GUTTERS.—Valley Gutters of the type selected and size required shall be formed from Zincanneal R.L. flat sheets or 24g. "Queen's Head" Galvanized Iron in 6' or 8' sheets and in widths of 14"-24" lapped a minimum of 6", soldered at joints, turned up at edges under roof covering and cut and lapped at eaves gutters. Care should be taken that Valley Gutters extend a minimum of 4" under Galvanized Iron or Zincanneal roof covering.

Valley Gutters are to be supported on and fixed to 1" thick valley boards with Galvanized clout nails, or secured with strong galvanized lugs, soldered and rivetted to valleys and nailed to roof timbers with galvanized clout nails. Nailing through valley sheets is to be avoided and nails should be driven above the valley and turned over the weather bead. Care should be taken when fixing the corrugated iron above the valley that any fixing nails do not pierce the valley gutters. Any hole made in the valley is a source of leakage.

Where timber gutter forming is not practical the valley gutters may be supported on 1" x $\frac{1}{8}$" galvanized strips at 36" centres; hooked over and secured to the lowest purlins of roof slopes. In such cases the Valley Gutters should be formed from sheet steel not lighter than 20 gauge.

When forming a Valley Gutter, care should be taken that the corrugated roof sheeting laps over the Valley Gutter a minimum of 4".

BOX GUTTERS.—The Box Gutters as illustrated overleaf are types of gutters that are suitable for construction between roof surfaces.

Box Gutters of the type selected and size required shall be formed from Zincanneal R.L. flat sheet, or 24g. "Queen's Head" galvanized iron in 6' or 8' lengths, laid on 1" rough boarding with a fall of 1" in every 12' towards the outlets. The gutter linings are to extend up the pitch of the roof for a minimum distance of 8" or to a point at least 5 vertical inches above the front edge of the gutter. All joints are to be lapped a minimum of 4", double rivetted and soldered. Alternatively, where timber framing is not practical the gutter lining may be supported on 1" x $\frac{1}{8}$" galvanized straps at 36" centres, hooked over and secured to the lowest purlins of roof slopes.

In such cases the gutter linings should not be lighter than 20 gauge and formed from single sheets.

BOX GUTTERS AT PARAPET WALLS.—Box Gutters of the type selected and size required shall be formed from 24g. Zincanneal R.L. or "Queen's Head" Galvanized Iron in 6' or 8' lengths laid between 1" rough boarding with a fall of 1" in every 12' towards the outlets. The gutter linings are to extend up the pitch of the roof for a minimum distance of 8", or to a point at least 5 vertical inches above the front edge of the gutter, dressed into corners, turned up and tacked over gutter purlins and against walls for the full height of the gutter purlin. Care should be taken when forming Box Gutters that they be allowed to ride free in order to allow for expansion and contraction.

Cover flash with 24g. Zincanneal let 1" into brick joints, lead wedged and pointed up with 2:1 sand and cement or taken up over parapets to form capping. Gutters shall be (a) extended through walls to rainwater heads or (b) given a fall to adequate sumps. The sumps are to be lined with 24g. Galvanized Iron or Zincanneal and fitted with 24g. Galvanized or Zincanneal outlet pipes. Provide and fix over all sumps, covers of stout crimp mesh galvanized wire.

SOLDER.—Where specified to be used, solder shall be of the best grade and shall consist of 50/50 tin and lead in the case of Galvanized Iron and 60/40 in the case for use with Zincanneal. All joints should be wiped dry.

IMPORTANT.—All Galvanized Iron gutters, flashings, etc., will last longer if the laps are painted, before fixing with zinc dust paint, red oxide, or any good quality roof paint. The points of contact are where corrosion usually begins.

This precaution has been proved to be the most effective in prolonging the life of a roof.

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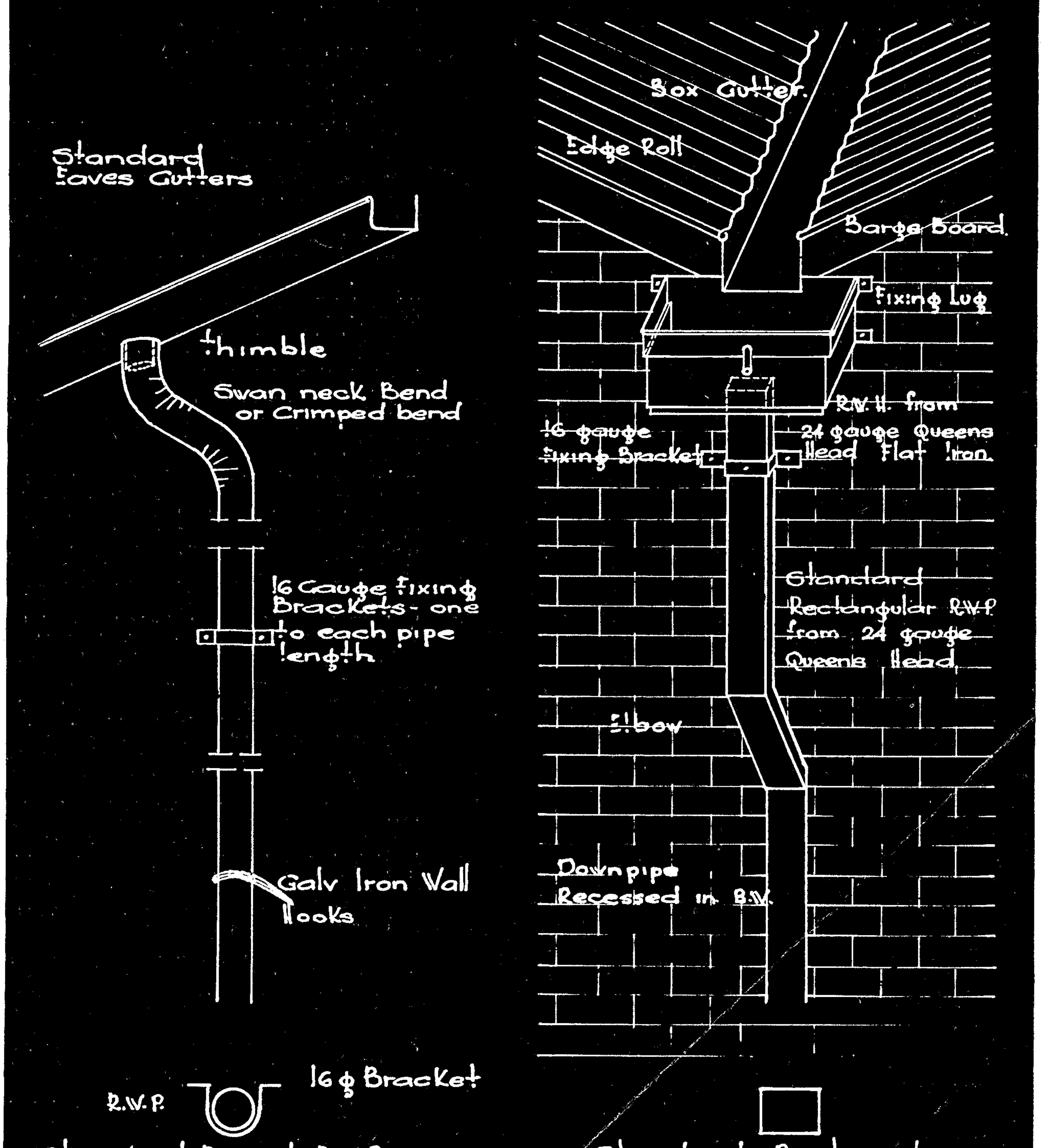
TYPES OF DOWNPIPES & RAINWATER HEADS


Standard Eaves Gutters
thimble
Swan neck Bend or Crimped bend
16 Gauge fixing Brackets - one to each pipe length
Galv Iron Wall Hooks
Box Gutter.
Edge Roll
Barge Board.
Fixing Lug
R.W.H. from 24 gauge Queens Head Flat Iron.
16 gauge fixing Bracket
Standard Rectangular R.W.P. from 24 gauge Queens Head.
Elbow
Downpipe Recessed in B.W.
R.W.P.
16 g Bracket

Standard Round R.W.P. obtainable in 24 or 26 g in the following Sizes 2", 2½", 3", 4" 5" and 6" Diameters and in lengths of 6', and 8'0"

Standard Rectangular R.W.P. obtainable in the following stock sizes 3"x2" 4"x2", 4"x3" and 6"x4" and in lengths of 6'0" and 8'0"

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BUILDING INFORMATION

LYSAGHT'S COUNTRY SERVICE

SHEET 3141

DOWNPIPES AND RAIN-WATER HEADS

GENERAL.— Downpipes are essential to carry water from the roofs of buildings to storage or disposal areas and are of two types, square or round. Each type can be used in conjunction with eaves gutters, or rainwater heads, as illustrated overleaf.

Downpipes of the types selected and size required are formed from 24g. "Queen's Head" Galvanized or Zincanneal R.L. flat sheet in 6' or 8' lengths. Seams of joints in downpipes may be either lapped $\frac{1}{4}$" and soldered, or formed with a $\frac{3}{8}$" seamed joint.

CIRCULAR DOWNPIPES.— As shown in Table below, the normal range of downpipes is from 2" to 6" dia. For cottage construction the usual size is 3", while 4" is used for farm sheds and similar structures. The larger 5" and 6" sizes are required for factory buildings.

Circular downpipes are to be formed with one end slightly larger than the other to allow a lap of $2\frac{1}{2}$" when lengths of downpipe are fitted together; or they can be formed of even cross-section with the end 2" or 3" crimped for assembling one pipe in the other.

The type of connection between lengths of downpipe varies in different States.

Dia. of Circular Pipe in inches	Area of Pipe in sq. inches	Roof area drained (sq. ft.)	Area of Building roofed
2"	3.14	314	304
$2\frac{1}{2}$"	4.9	490	475
3"	7.07	707	686
4"	12.56	1,256	1,218
5"	19.63	1,963	1,905
6"	28.27	2,827	2,742

SQUARE AND RECTANGULAR PIPES.— Square and rectangular pipes vary as shown in the Table below. For normal cottage construction 4" x 2" is recommended.

Size of Piping in inches	Area of Pipe in sq. inches	Roof area drained (in sq. ft.)	Area of Building roofed (in sq. ft.)
3" x 2"	6	600	582
4" x 2"	8	800	775
4" x 3"	12	1,200	1,165
4" x 4"	16	1,600	1,555
5" x 4"	20	2,000	1,940
6" x 4"	24	2,400	2,315

SIZE OF DOWNPIPES.— When calculating the size of downpipes required for any given building and area of roof, the following rules should be observed.

For every 100 square feet of actual roof area drained 1 square inch of downpipe is required, whether round or square. This calculation is based on the assumption that the maximum rainfall does not exceed 5" per hour.

It is considered the best practice to drain to different points using smaller downpipes rather than to one large outlet. Where possible downpipes should be spaced at not more than 40' centres, in which case the gutters should be slightly wider than the greater dimension of the downpipe used. Types of gutters, etc., are dealt with elsewhere in this series of Data Sheets.

FIXING OF DOWNPIPES.— Downpipes may be secured:—

1. To weatherboards with 16g. galvanized or Zincanneal straps screwed to the weatherboard sheeting.
2. To brick-work joints with galvanized steel wall hooks, one to each length of downpipe, or with 16g. iron straps fixed to wall blocks with galvanized screws and washers.

   For additional holding capacity 16g. galvanized iron straps can be soldered to the downpipe and fixed to the downpipe together with a self-tapping screw through the middle of the bracket.
3. To corrugated iron wall siding sheets with 16g. straps bolted to the sheet with a pair of 3/16" galvanized gutter bolts and washers.

   Downpipes should be blocked out 1" clear of all walls and painted prior to fixing.

Where buildings face a street alignment, the lower length of pipe may be of cast iron and is known as a cast iron lead pipe. In all buildings on the street alignment, rectangular downpipes should be used and chased into the lower 6' of the brick walls.

RAINWATER HEADS.— Rainwater heads are normally required to collect water from box gutters at the junction of two roofs. These are constructed of 24g. "Queen's Head" or Zincanneal R.L.

Size is entirely dependant upon roof area drained, the length and size of gutter required, and the size downpipe used, the rainwater heads acting as a reservoir. The type varies with the manufacturer but a number of standard patterns exist in the various States or any plumber can construct one to any individual design. The rainwater head should be fixed so that the box gutter enters the rainwater head approximately 1" below rim level. 1" dia. overflow spout should be provided approximately 1" below gutter entry level. Provide and solder in poppet, to allow fitting of the downpipe.

DOWNPIPE AUXILIARIES.— For connecting pipes to gutters, changing directions, etc., various fittings exist, such as swan necks or crimped bends of which most can be obtained through local hardware merchants. Others are made up by plumbers as required. Galvanized crimp wire gratings are to be provided at all downpipe outlets.

SOLDERING.— Downpipes are fitted so that the lower length fits inside the upper lengths some $1\frac{1}{2}$"-2". Joints are sweated and soldered. Where specified to be used, solder shall be of the best grade and consist of 50/50 tin and lead in the case of Galvanized Iron or 60/40 for use with Zincanneal. When using Zincanneal, an active flux such as 50% "killed" spirit and 50% low spirit should be used. All joints are to be wiped dry.

DISPOSAL OF RAINWATER.— Where it is necessary to retain the water, vertical downpipes should lead direct into corrugated storage tanks. As far as possible, each tank should have its own outlet from the roof. Where it is necessary for the water from the roofs to be dispersed, downpipes should lead directly into a sump and thence to rubble disposal drains or earthenware pipes, dependant upon method of construction adopted.

Sumps should be concreted over with rounded shoe pieces and the area around the downpipe outlet maintained in a dry condition.

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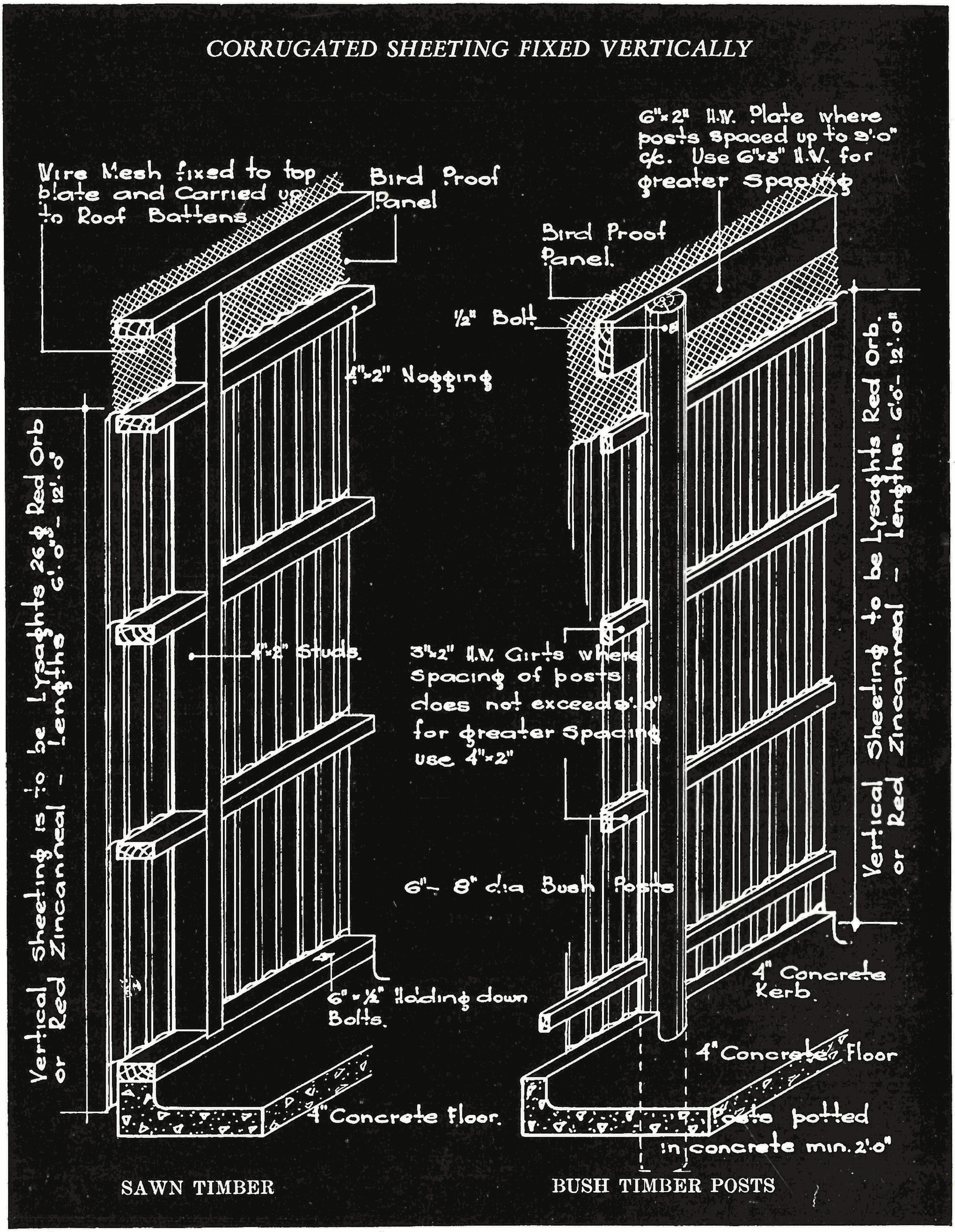

CORRUGATED SHEETING FIXED VERTICALLY

Wire Mesh fixed to top plate and Carried up to Roof Battens
Bird Proof Panel
4"×2" Nogging
Vertical Sheeting is to be Lysaghts 26 g Red Orb or Red Zincanneal - Lengths 6'.0" - 12'.0"
4"×2" Studs.
6"×½" Holding down Bolts.
4" Concrete Floor.
6"×2" H.W. Plate where posts spaced up to 9'.0" c/c. Use 6"×3" H.W. for greater Spacing
Bird Proof Panel.
½" Bolt
3"×2" H.W. Girts where Spacing of posts does not exceed 9'.0" for greater Spacing use 4"×2"
6"- 8" dia Bush Posts
Vertical Sheeting to be Lysaghts Red Orb. or Red Zincanneal - lengths 6'0" - 12'.0"
4" Concrete Kerb.
4" Concrete Floor
Posts potted in concrete min. 2'.0"

SAWN TIMBER

BUSH TIMBER POSTS

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BUILDING INFORMATION

LYSAGHT'S COUNTRY SERVICE

SHEET 3151

CORRUGATED SHEET SIDING — FIXED VERTICALLY

GENERAL.—Illustrated overleaf are two methods of timber construction utilising corrugated steel sheet fixed vertically. Lysaght Corrugated Galvanized Iron or Zincanneal sheet has proved itself as the best material for siding of farm buildings and allied structures due to the rigidity and strength of the material. Sheet steel has the strength to withstand severe accidental knocks, shock, etc., without cracking as occurs in substitute materials.

Vertical walls should be sheeted with Red Orb or Zincanneal corrugated sheet. The sheets are available in two widths, the more usual 10-3" corrugations, or the 8-3" corrugations in lengths of 5' to 12'.

Sheet steel is easily adaptable to sawn or bush timber framed structures.

All nails, screws, fixings, etc., shall be galvanized.

SAWN TIMBER CONSTRUCTION.—Walls are framed up in:—

4" x 2" studs; centres not to exceed 4'.

4" x 2" or 3" x 2" nogging pieces; centres not to exceed 5'.

Where a concrete floor is required, the bottom plate is secured to a 4" concrete curb with 6" x $\frac{3}{8}$" rag bolts let in to the concrete curb while pouring at not more than 3' centres.

In lieu of nogging pieces as specified above, 3" x 2" horizontal girts may be checked into the 4" x 2" studs.

BUSH TIMBER CONSTRUCTION.—Where it is decided or necessary to use round bush poles as the main supporting members of truss construction, it will be found that the method as shown in the sketch overleaf is most satisfactory.

Bush poles should be of sufficient size to give a 6" dia. at the small end, and should be let into the ground 1/5th of the total height with a minimum depth of 2', the portion embedded in the ground (or concrete blob footing) being coated with creosote or hot tar before erection.

Horizontal girts shall be of 3" x 2" hardwood checked into vertical poles. Where spacing of the poles exceeds 8', 4" x 2" hardwood horizontal girts are to be used spaced vertically at not more than 3' centres. The top plate shall be of 6" x 2" hardwood where the spacing of posts does not exceed 8', and 6" x 3" hardwood for spacings up to 12'. These hardwood plates shall be bolted to the top of the bush posts with $\frac{1}{2}$" M.S. bolts with square washers. The top of the post is to be halved to receive the top plate. The ventilating panel as shown may be fixed as specified above.

VENTILATING PANEL.—Where a ventilating panel is required under the eaves a nogging piece or a girt is to be checked into the studs 8" above the top plate. Galvanized bird wire is then tacked to this horizontal timber and carried up over the roof batten before fixing the side sheeting, to ensure a bird-proof panel.

CONCRETE FLOORS.—Concrete floors should be of 5:2:1 mix, a minimum of 3" thick and poured where possible in one operation. Should it be necessary to pour areas greater than 200 sq. ft. it will be necessary to provide expansion joints of bituminous compound. By forming a 4" curb as shown, a vermin-proof and water-tight junction of vertical sheet with the floor is obtained. Interior angle of this curb should be rounded in any location where cleanliness is paramount, such as in dairies, milking bails, etc.

WALL SHEETING.—The walls are to be sheeted with the required lengths of Lysaght's 10-3" corrugations Galvanized Iron or Zincanneal sheet applied with a side lap of one corrugation. Sheets are secured to noggings, girts, or battens with spring-headed roofing nails through the top of every second corrugation at the ends of sheets and three nails per sheet at intermediate fixings. Should the wall necessitate lapping of vertical sheeting this would be applied with a minimum end lap of 4".

QUANTITIES.—To determine the number of sheets required for the side walls of any building, the following is useful:—

$$\frac{\text{Total Perimeter of Buildings}}{2.5}$$

This will give accurately the number of sheets required of the desired length, i.e., height from floor to ventilating panel using Lysaght's 26g. 10-3" corrugated sheets. If 26g. 8-3" corrugated sheets are used, substitute 2.00 for 2.5 in the above calculation. Deductions must be made for any door or window openings. It is generally advisable to add one sheet extra per corner for finishing, etc.

PAINTING.—The points of contact are where corrosion usually begins. Galvanized Iron and Zincanneal siding will last longer if the end and side laps of the sheet are painted before fixing with zinc dust paint, red oxide, or any good quality roof paint.

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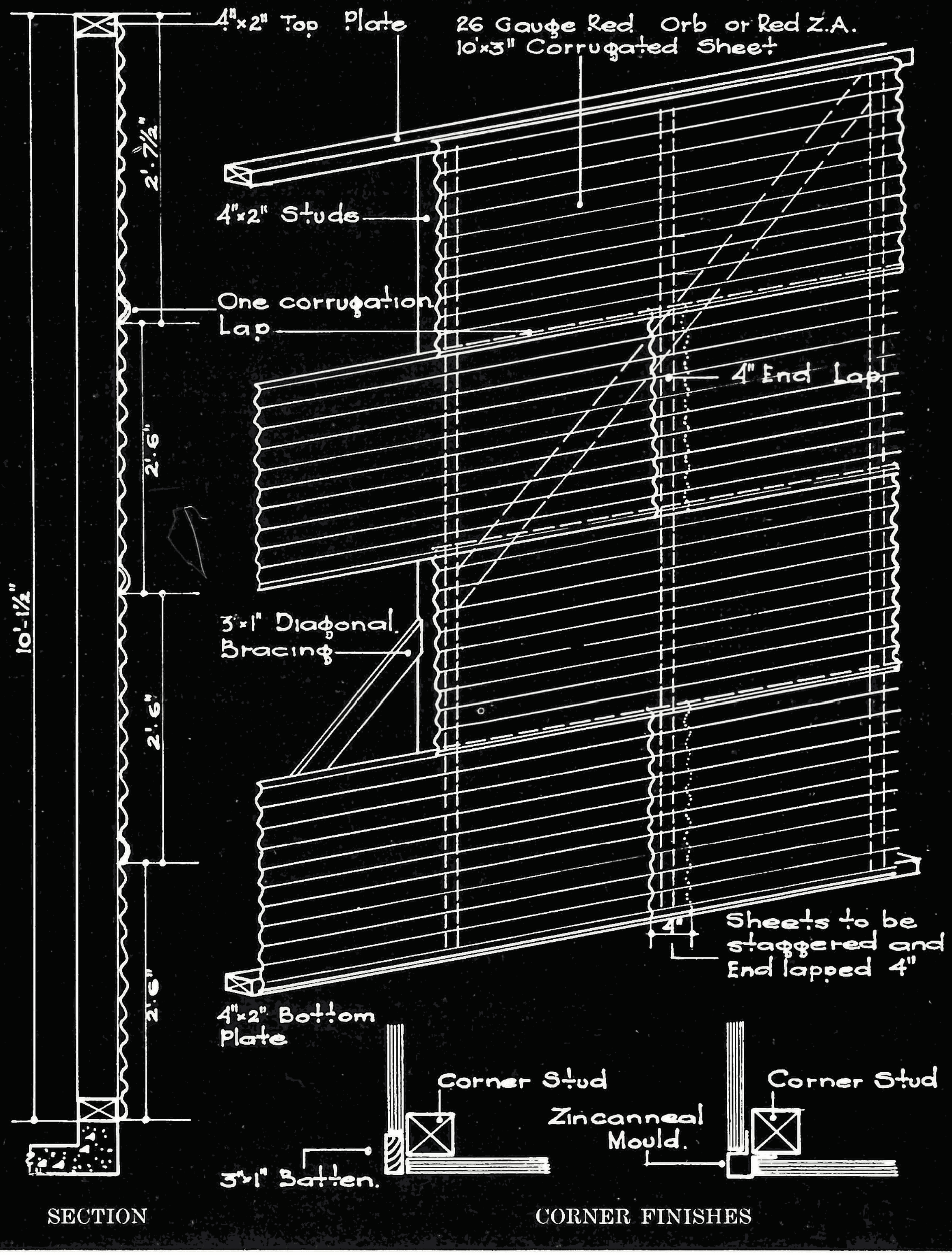
CORRUGATED SHEET SIDING
(FIXED HORIZONTALLY)



BUILDING INFORMATION

LYSAGHT'S
COUNTRY SERVICE

SHEET 3152

CORRUGATED SHEET SIDING — FIXED HORIZONTALLY

GENERAL.— Where it is desired to introduce variation in the external sheeting of a building, whether by choice or by the necessity to use short sheets of corrugated sheeting to the best advantage, horizontal sheeting will provide an excellent alternative to the vertical sheeting as described previously. The rigidity and strength of the horizontal sheeting has the qualities necessary to withstand any accidental shocks, knocks, etc., and the use of sheet steel will not crack and facture as often occurs in substitute materials.

Walls may be sheeted with Red or Blue qualities of Lysaght's Orb and Zincanneal Brands of corrugated sheet. The sheets are available in two widths, the more usual 10-3" corrugations, or the 8-3" corrugations in lengths of 5'-12'.

Using one corrugation lap, the most economical wall heights are:—

Using 10-3" corrugations: 7' 7½" 10' 1½" 12' 7½", etc.
Using .8-3" corrugations: 8' 1½" 10' 1½" 12' 1½", etc.

Sheet steel is easily adaptable to sawn or bush timber framed structures. All screws, nails, fixings, etc., shall be galvanized.

SAWN TIMBER CONSTRUCTION.— Generally walls for sheeting horizontally with corrugated sheeting shall be framed with 4" x 2" hardwood studs, 4" x 2" top and bottom plates, and 3" x 1" diagonal bracings. The spacing for studs, for the most economical fixing of the various lengths of Lysaghts corrugated sheet are shown in the table below.

Length of Sheet to be used	Spacing of Studs, etc.
5'	2' 4"
6'	2' 10"
7'	3' 4"
8'	3' 10"
9'	4' 4"
10'	4' 10"
11'	3' 7"
12'	3' 10½"

Where a concrete floor is required, the bottom plate is secured to a 4" concrete curb with 6" x ⅜" rag bolts let into the concrete curb while pouring at not more than 3' centres.

VENTILATING PANEL.— Where a ventilating panel is required under the eaves, a nogging piece or girt is to be checked into the studs below the top plate at whatever distance it is desired to form the ventilating panel. Galvanized bird wire is then tacked to this horizontal timber and carried up over the roof batten before fixing the side sheeting, to ensure a bird proof panel.

CONCRETE FLOORS.— Concrete floors should be of 5:2:1 mix, a minimum of 3" thick and poured where possible in one operation. Should it be necessary to pour areas greater than 200 sq. ft. it will be necessary to provide expansion joints of bituminous compound. By forming a 4" curb as shown, a vermin-proof and water-tight junction of vertical sheet with the floor is obtained. Interior angle of this curb should be rounded in any location where cleanliness is paramount, such as in dairies, milking bails, etc.

WALL SHEETING.— The walls are to be sheeted with the required lengths of Lysaght's 10-3" corrugations Red Orb Galvanized Iron or Red Zincanneal sheets fixed longitudinally and applied with a side lap of one corrugation and an end lap of 4". Sheets should be laid from the bottom, care being taken that each upper sheet laps over the sheet immediately below. Sheets are secured to vertical studs with spring-headed roofing nails or screws through the top of every second corrugation at the ends of sheets and three nails per sheet at intermediate fixings. It is a distinct advantage to stagger the laps on the wall face of a building as shown in the sketch overleaf.

CORNER FINISHES.— Walls of corrugated Galvanized Iron or Zincanneal sheets fixed horizontally may be finished in several ways as shown in details overleaf.

By forming a square corner mould from 24g. "Queen's Head" or Zincanneal flat sheet fixed to detail as shown overleaf.

By a timber finish by which sheets butt against the end of the 3" x 1" batten and against the side on the return.

QUANTITIES.— To estimate the number of sheets required for the side walls of any building the following is useful:—

$$\frac{\text{Total Perimeter of Building x No. of Sheets high}}{\text{(Length of Sheet used — 4")}}$$

PAINTING.— Galvanized Iron and Zincanneal siding will last longer if the end and side laps of the sheets are painted before fixing with zinc dust paint, red oxide, or any other good quality roof paint.

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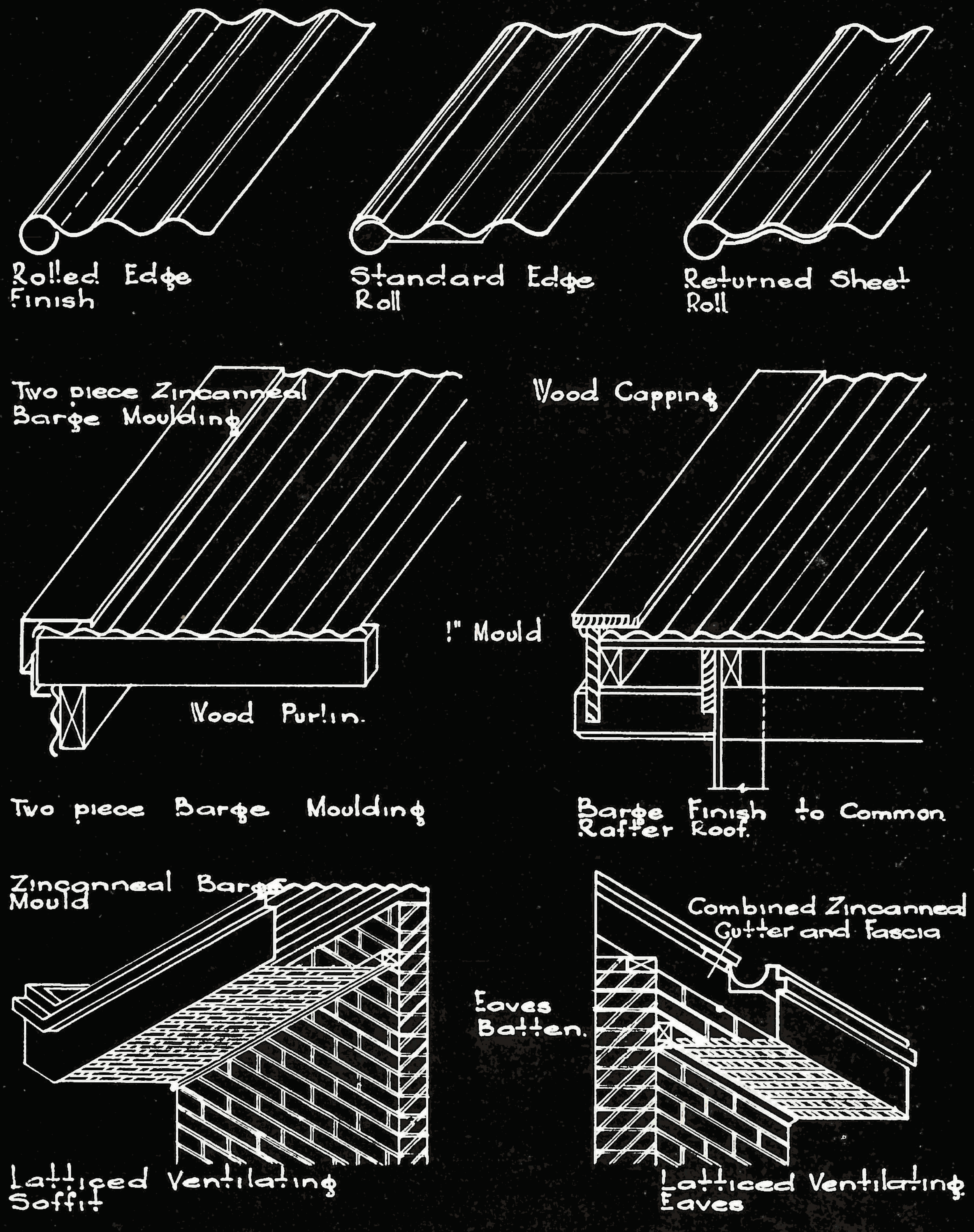
AUSTRALIA

BUILDING INFORMATION

LYSAGHT'S COUNTRY SERVICE

SHEET 3161

FINISHES — EDGE ROLLS — BARGE BOARDS


Rolled Edge Finish
Standard Edge Roll
Returned Sheet Roll
Two piece Zincanneal Barge Moulding
Wood Capping
1" Mould
Wood Purlin.
Two piece Barge Moulding
Barge Finish to Common Rafter Roof.
Zincanneal Barge Mould
Combined Zincanneal Gutter and Fascia
Eaves Batten.
Latticed Ventilating Soffit
Latticed Ventilating Eaves

DETAIL OF GABLE ENDS

DETAIL OF EAVES

LYSAGHT'S COUNTRY SERVICE

FINISHES, EDGE ROLLS — BARGE BOARDS

GENERAL.— A problem that often confronts the owner erecting buildings in the country is to ascertain the correct and most pleasing finish at the point where the corrugated sheet steel roof finishes at a gable end in shed construction or against the wooden barge board in domestic construction.

Overleaf we have illustrated various methods of finishing the roof at these points.

ROLLED EDGE FINISH.— Where a corrugated sheet steel roof finishes on to a rafter or barge board the simplest method of finishing the sheet is to bend the last corrugation of the roofing sheet around a suitable diameter pipe or similar object, to form a neat rolled edge. This last sheet can then be fixed by nailing or screwing at every 18" on the length of the sheet.

STANDARD EDGE ROLL.— Where it is desirable to ensure a watertight finish on to a barge board or rafter and the amount of corrugated sheet remaining is not sufficient to form a rolled edge finish, a suitable method is as shown overleaf as a standard edge roll. A piece of flat sheet 10" in width should be used with one edge rolled around a water pipe or similar object and clamped into position as shown, ensuring that the last corrugation of the roofing sheet and the roll of the flat sheet fit snugly. The standard edge roll should then be fixed every 18" to the barge board or rafter with galvanized nails or screws.

RETURNED SHEET ROLL.— Where it is found that owing to the dimensions of the building, that a portion of the last roofing sheet remains after completing the roof sheeting it will be advisable to roll those corrugations which are left over in such a fashion so as to return upon themselves. This sheet will then be fixed as specified above for normal roofing sheets.

BARGE FINISHES.— Where it is desired in domestic construction to construct a barge finish which is more pleasing in appearance than the standard roll finishes, the two methods as shown overleaf will apply.

(a) By means of a wood barge board and wood capping.

(b) By a 24g. two piece barge moulding.

As various forms of this finish may be constructed to individual tastes it is not proposed to specify in detail as it is felt that the illustration overleaf will form a suitable guide.

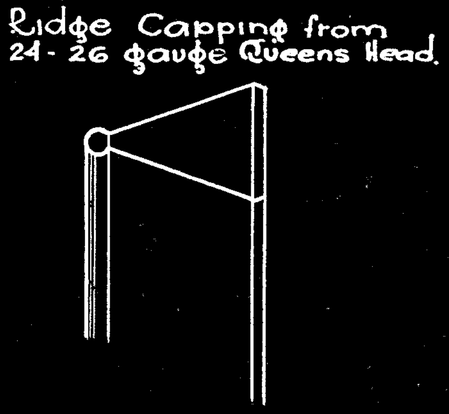
COMBINED EAVES GUTTER AND FASCIA.— The combined eaves gutter and fascia shall be 24g. "Queen's Head" Galvanized Iron or Zincanneal sheet in 6' or 8' lengths moulded to detail as shown overleaf, and secured to the end of rafters and to eaves batten with galvanized screws and washers or galvanized joining strips at back of fascia.

The latticed ventilating eaves soffit shall be formed from 1" wide strips of 24g. "Queen's Head" or Zincanneal flat sheet interlaced and rivetted at every third cross over, nailed to 2" x 2" wall batten at wall face and rivetted to the bottom of the eaves fascia at all points of contact.

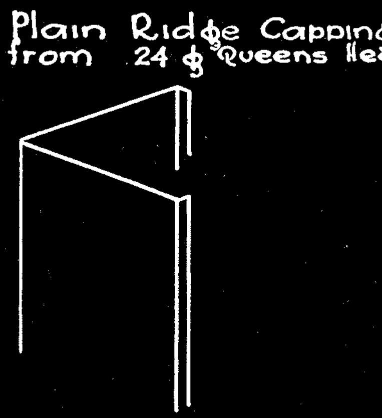
The gable rake shall be finished by applying to the projecting battens standard metal fascia mould as specified above, complete with latticed metal ventilating eaves. The top of the fascia mould is to be secured to the upturned edge of roofing sheet with galvanized gutter bolts spaced approximately 1' 6" centres and the eaves lining fixed to the fascia with gutter bolts at 1' 6" centres, and the underside of the wood plate with galvanized clouts.

LYSAGHT ORB AUSTRALIA

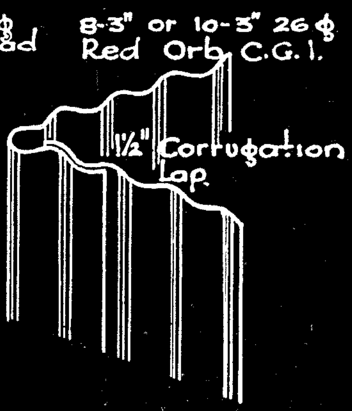
STANDARD CORNER FINISHES FOR VERTICAL CORRUGATED SHEETING



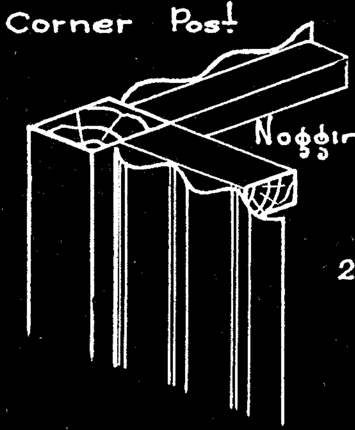
STANDARD RIDGING



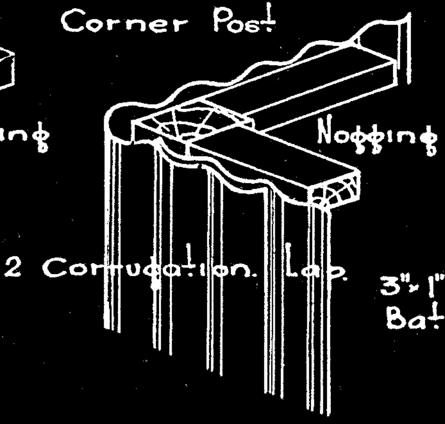
PLAIN RIDGING



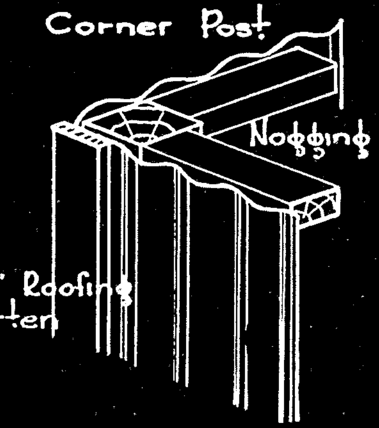
CORRUGATED SHEET WITH RETURN



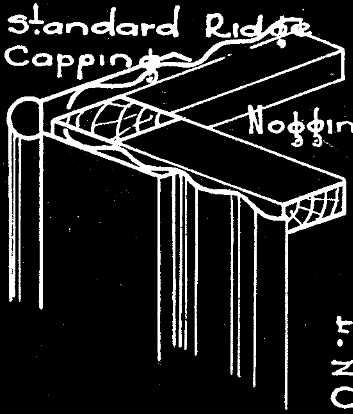
BUTT FINISH



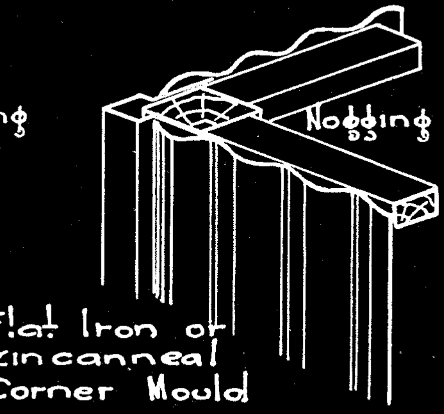
CORRUGATED SHEET WITH RETURN



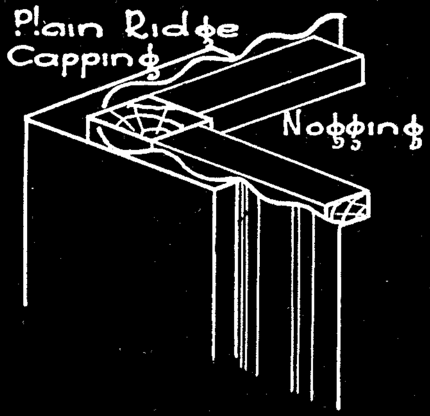
TIMBER CAP



STANDARD RIDGING



SHEET STEEL CORNER MOULD



PLAIN RIDGE CAPPING

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BUILDING INFORMATION

LYSAGHT'S COUNTRY SERVICE

SHEET 3162

CORNER FINISHES — VERTICAL CORRUGATED SHEETING

GENERAL.—Walls of Corrugated Galvanized Iron or Zincanneal fixed vertically may be finished at the corners in a variety of ways as illustrated overleaf.

1. Timber finishes in which the sheets either butt against the corner post or are fixed in conjunction with a 3" x 1" batten.
2. Using normal ridging either standard or plain.
3. Returning the corrugated sheets, or using half a corrugated sheet cut lengthwise.
4. Specially moulded flat sheet concealed corner finishes.

There is no doubt that the easiest method for sheds is the return sheet, but it is suggested that other methods be considered where appearance is paramount. In this regard the standard ridging finish is both pleasing and economical.

BUTT FINISH.—Sheets of Corrugated Red Orb or Zincanneal sheet are butted against projecting corner studs, nogging being set in $\frac{3}{4}$"-1". This type is not suited for batten construction.

BATTEN FINISH.—This is used for construction when battens or noggings are flush with studs and corner posts. The sheet on one side of the building slightly overlaps the sheet on the adjacent side. The corrugations are hammered flat prior to fixing a 3" x 1" batten.

STANDARD AND PLAIN RIDGING.—When using standard or plain ridging, sheeting need not completely cover the side of the buildings but may be one or two corrugations short of width provided that the capping laps over the corrugated sheets at least 3". Ridging is fastened to corner posts and to noggings or battens. Lengths of ridging are lapped 4" minimum and supplied in 6' or 8' lengths.

RETURN SHEET.—Sheets can be corner finished by taking one corrugated sheet round the corner, over the adjacent sheet to give a minimum of one and a half corrugations side lap. Sheets are fixed with galvanized roofing nails, or screws and washers pierced through the top of corrugations and fixed to corner posts, batten or nogging.

SPECIAL CORNER MOULDS.—Special concealed corner finish mouldings may be constructed from 24g. "Queen's Head" or Z.A.R.L. sheets in 6' or 8' lengths. These are fastened to corner posts in conjunction with corrugated sheets by galvanized roofing nails or screws and washers. Fastenings are tightened down until corrugated sheets butt neatly into moulds.

PAINTING.—Points of contact are where corrosion usually begins. Return or corrugated capping corner finishes will last longer if the side laps of the sheet are painted before fixing. Both sides of all corner finishes should be painted prior to fixing.

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LYSAGHT'S
COUNTRY SERVICE

FARM BUILDINGS SECTION

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FOREWORD

This section of the Country Service Manual deals with buildings which are common to most agricultural requirements. The sheets should be read in conjunction with the appropriate complementary section found elsewhere in this Manual.

As the Primary Industries have become established throughout Australia, the general finish of structures has improved. Sawn timber replaces bush timber for individually designed structures, while the modern tendency is to use prefabricated steel buildings where standard types are suitable. Consequently a variety of designs have been carefully collated to cover the general requirements of rural activity.

The Red Quality Galvanized Orb and the Red Quality Zincanneal Corrugated Steel Sheets, foremost in value for roofing and walling, owing to their adaptability and economy, are recommended in the 10 x 3" corrugations size for general constructional purposes. The Red Quality is stronger, harder, and more suitable for load bearing than the Blue Orb Quality Sheet, which is made primarily for tank-making and curving.

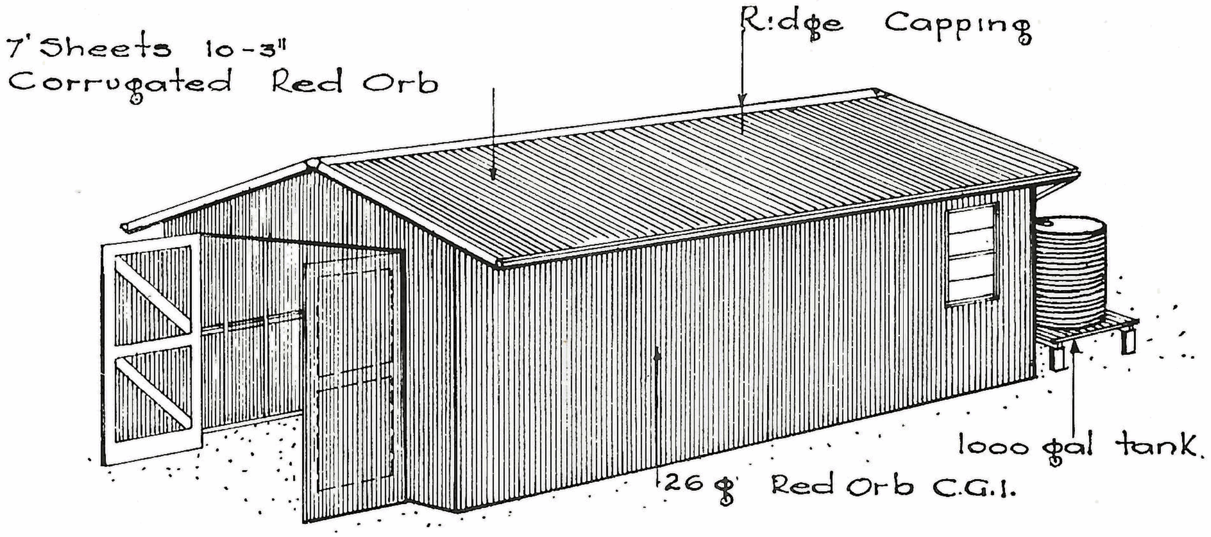
Our Advisory Service exists for the continuous study and selection of suitable building advice, advice to the farmer and owner, and the preparation of special Data Sheets and Plans. In this regard the co-operation of farmers is sought in the preparation of new and revised editions. You are invited to contact our Service Department on your particular problem.

FARM BUILDINGS SECTION

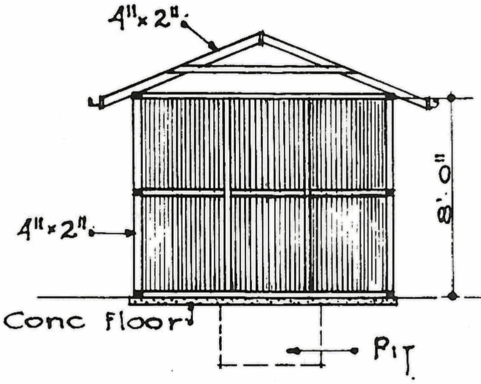
LYSAGHT'S
COUNTRY SERVICE

SHEET 4122

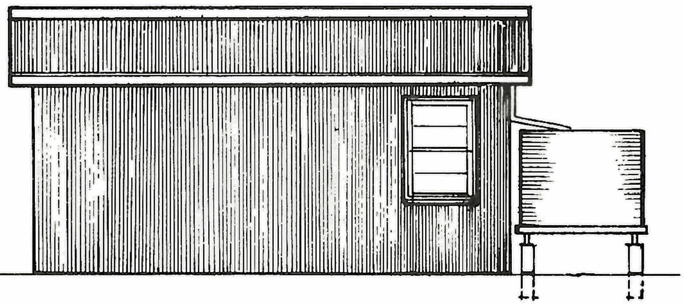
SINGLE CAR GARAGE



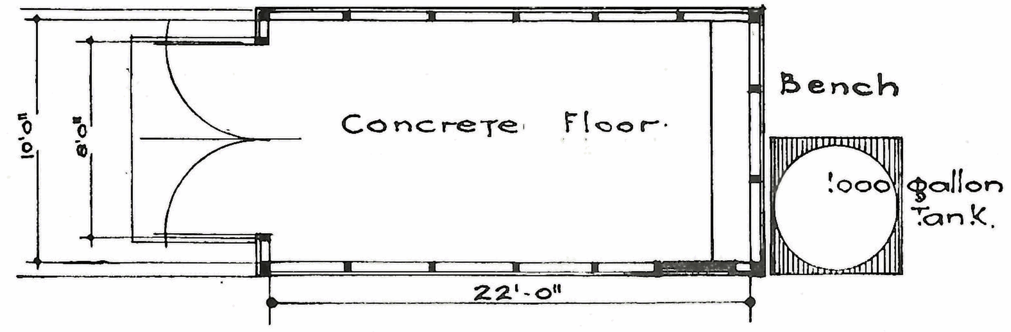
ISOMETRIC VIEW



CROSS SECTION



SIDE ELEVATION



PLAN

FARM BUILDINGS SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4122

SINGLE CAR GARAGE

GENERAL.—This sheet indicates a single vehicle garage, constructed on economical lines, which enables small repairs to be carried out on the bench at the rear. The dimensions, 22' long x 10' wide and 8' high clear internal measurements will accommodate car, truck, or station waggon.

FLOOR.—The floor should be a 4" concrete slab, of 5:2:1 concrete mix, graded to fall towards the front, built some 4"-6" above outside ground level. If it is desired to form an inspection pit in the garage, this should be 4'-5' long x 3' 6" deep, the walls to be of 6" concrete. It is advisable for a 12" x 12" x 12" sump to be formed at the bottom of the pit, to enable any water to be bailed out as it accumulates. This sump should be covered with a W.I. grating or duck boarding. The 4" concrete floor should be carried outside the front of the building some 4'-5' and at least equal to the swing of the double doors.

WALL FRAMING.—The walls are framed up with 4" x 4" corner and door studs, 4" x 2" intermediate wall studs at 3' 6" to 4' 0" centres, halved into 4" x 2" top and bottom plates. 4" x 2" noggings are to be fixed half way up the wall between studs as a nailing piece for wall sheeting. The whole wall is to be braced by 3" x 1" diagonal bracing. The bottom plate is to be secured to the floor by ½" diameter rag bolts, embedded in concrete.

ROOF FRAMING.—The roof is to be framed up with 4" x 2" rafters, at not more than 2' 6" centres, birds-mouthed over the top plate and secured to 6" x 1" ridging. 4" x 2" collar ties are to be provided at every second rafter. Gable spandrils may be framed up with 3" x 2" nogging pieces. Provide 3" x 1¼" battens for roof fixing.

WALL SHEETING.—The whole of the exterior of the garage should be sheeted with 8' lengths of 10 x 3" corrugations 26g. Red Orb or Red Zincanneal sheets, applied with a side lap of one corrugation. Sheets should be secured to top and bottom plates and intermediate noggings with spring headed roofing nails, pierced through the top of every third corrugation at end of sheets, and every fourth corrugation at intermediate points.

ROOFING.—The roof is sheeted with 7' lengths of Lysaght's 10 x 3" corrugations 26g. Red Orb or Red Zincanneal steel sheets, with 1½ corrugations side lap. Sheets shall be secured to battens with spring headed roofing nails, pierced through the top of every second corrugation at end fixings, and three to each sheet at intermediate battens.

BARGE FINISH.—Barge shall be finished with 6" x 1" cypress pine or hardwood barge board. Roof sheeting shall be finished over barge board with rolled edge or standard edge roll, as required.

RIDGING.—Ridge capping shall be of 24g. "Queen's Head" galvanized iron or Zincanneal, formed from 18" wide strips in 6' or 8' lengths. Ridge capping shall be lapped at least 6" at joints and securely fixed in position in conjunction with roofing sheets with spring-headed roofing nails or galvanized screws and washers.

EAVES GUTTERS.—Eaves gutters are to be of 24g. "Queen's Head" galvanized iron or Zincanneal of the 4½" beaded quadrant type, fixed in position with required falls to the rear, and secured with 16g. galvanized brackets to the foot of roof rafters.

DOWNPIPES.—Provide and fix 24g. "Queen's Head" galvanized iron or Zincanneal 2½" diameter round downpipe, with the necessary bends and joints.

DOORS.—Twin doors, 7' 6" x 4', are to be fixed to the garage, framed up in 5" x 2" cypress or hardwood styles, top rail 5" x 2", bottom rail 10" x 2", ledged and braced and hung with three 12" heavy "T" hinges.

WINDOW.— Provide window to dimensions, as required, of box-framed type, sashes to be not less than 1½" thick, double hung with cotton cord over two pulleys or Acme Sash Balances.

BENCH.—Frame up bench in 4" x 2" scantlings and 6" x 1½" sheeting.

LIST OF QUANTITIES

TIMBER—

Size	Purpose.	Length.	Number
4" x 4"	Posts	8	6
4" x 2"	Studs	8	12
	Bottom Plate ..	23	2
		11	1
	Top Plate	25	2
		11	2
	Noggings	21	2
		10	1
		4	4
	Rafters	8	24
	Bench	35	pieces
3" x 2"	Collar Ties ..	11	4
	Bench Legs, etc..		
3" x 1"	Bracing	12	4
		15	2
3" x 1¼"	Battens	24	6
6" x 1½"	Bench Sheeting..	30	1
6" x 1"	Ridging	25	1
	Fascias	25	2
	Barges	8	4
10" x 2"	Door	4	2
5" x 2"	Door	8	4
		5	4
		4	4

Window framing timber and window, as required.

GALVANIZED SHEET—

Purpose.	Type.	Size.	Length.	Number
Roof	Red Orb ..	10 x 3 corrs. 26g.	8ft.	22
Siding ..	Red Orb ..	10 x 3 corrs. 26g.	8ft.	30
Doors	Red Orb ..	8 x 3 corrs. 26g.	7ft.	4
Ridging ..	Queen's Head	18" wide, 24g.	8ft.	3
Guttering ..	Queen's Head	4" beaded quadrant, 24g.	8ft.	6
Downpiping .	Queen's Head	2½" dia., rounded, 24g.	8ft.	3
Flashings ..	Queen's Head	36" wide, 26g.	6ft.	1

CONCRETE—

Cement	14 bags
Sand	1½ cub. yds.
Aggregate	2½ ,, ,,

MISCELLANEOUS—

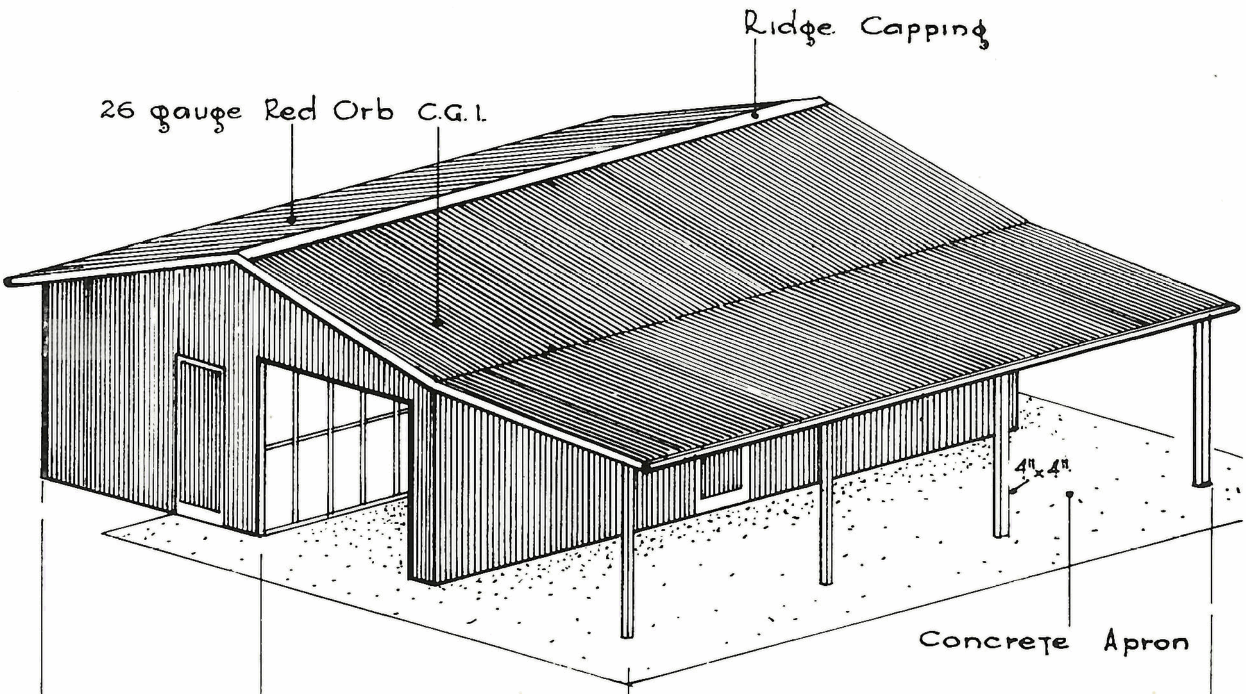
⅜" or ½" dia. rag bolts, gutter brackets and bolts, spring headed nails, and other nails and fixings, as required.

FARM BUILDINGS SECTION

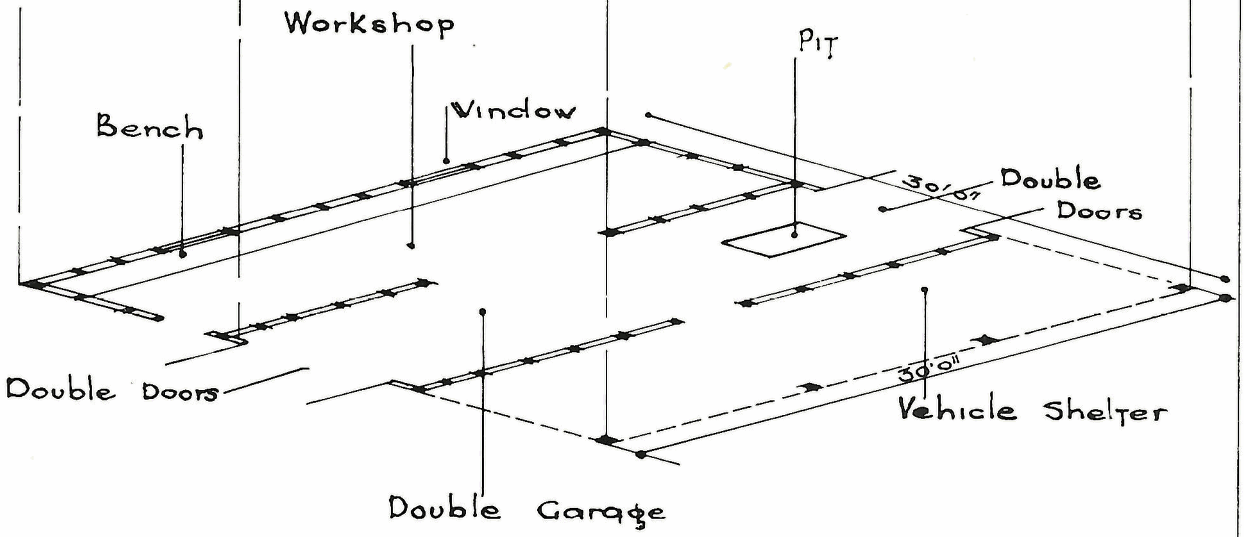
LYSAGHT'S
COUNTRY SERVICE

SHEET 4124

GARAGE AND WORKSHOP



ISOMETRIC VIEW



PLAN

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FARM BUILDINGS SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4124

GARAGE AND WORKSHOP

GENERAL.— In the sketch overleaf, we have indicated a suitable building designed to provide accommodation required by the property owner, who, from time to time, finds it necessary to carry out small repair jobs on plant and machinery on his own property. This building is of simple construction, low cost, and designed solely for the shelter and repair of farm machinery and mechanical equipment. It will not be suitable for every owner's requirements, but it is felt that the provision of a workshop, which may be locked up every night, is a necessary adjunct to the owner who has a large amount of machinery to maintain.

FLOOR.— The floor of the workshop and garage should be of 5:3:1 concrete mix, graded to fall towards the exits of the shed. An inspection pit in the garage is necessary and should be 4'—6' long x 3' deep, the walls being formed of 6" concrete. A sump should be provided 12" x 12" x 12" at the bottom of this pit, to enable any water, which may accumulate, to be bailed out. This sump should be covered with a wrought iron or detachable wooden grating. Floor of the lean-to machinery shelter portion may be constructed of well consolidated and rammed hard filling. Broken stone is very suitable for this purpose. The concrete floor of the garage and workshop, and shelter floor should be laid some 6" above the surrounding levels, so as to overcome any possible drainage problem.

WALL FRAMING.— The walls are to be framed up with 4" x 4" hardwood corner and door studs, 4" x 2" intermediate studs at 2' 6" to 3' 0", halved into 4" x 2" top and bottom plates, bottom plates being bolted to dwarf bolts by ½" rag bolts. Provide 8" x 2" hardwood plates over double doors and openings exceeding 6' in length. Provide 3" x 2" nogging pieces, 5' from floor level, and fix between studs as nailing pieces for corrugated iron sheeting. All walls are to be braced diagonally with 3" x 1" diagonal braces, checked into studs. The dividing wall between workshop and garage area is to be carried up to the ridge height. This will add to the security of the workshop, and dispense with the necessity of framing up roof trusses.

ROOF FRAMING.—The roof is to be framed up in 4" x 2" hardwood timbers throughout. Each rafter is to be spiked to a 4" x 2" top plate, set on top of the dividing wall between garage and workshop, and fixed to a 6" x 1¼" ridge piece. Roof over the lean-to portion is to be constructed of 4" x 2" hardwood rafters, at 3' centres, spiked and strapped with 16g. strapping to roof rafters and top plate of garage wall and birds-mouthed over an 8" x 2" plate, bolted to 4" x 4" exterior uprights on the outside of the lean-to shelter. Provide 4" x 2" collar ties every second rafter, to pass through, and to be fixed to dividing wall between the garage and the workshop.. Fix 3" x 1½" battens at not more than 4' 6" centres, to provide fixing for corrugated galvanized iron roof.

WALL SHEETING.— The walls should be sheeted with 10' sheets of 26g. Lysaght's 10 x 3" corrugations Red Orb or Zincanneal, applied with a side lap of one corrugation. Sheets are secured with spring headed roofing nails or galvanized screws and washers, to top and bottom plates and noggings, through the top of every second corrugation, at the end of sheets, and three to each sheet at intermediate points.

For gable end, sheets are cut to the required size and end lapped 4".

ROOF SHEETING.— The roof is sheeted with 12' lengths of 26g. Lysaght's 10 x 3" corrugations Red Orb or Zincanneal, applied with a side lap of 1½ corrugations. Sheets are fixed with spring headed roofing nails or galvanized screws and washers, through the top of every second corrugation at end of sheets, and through the top of every third corrugation at intermediate battens. Where the skillion roof joins the main roof, the lap is to be a minimum of 6".

RIDGING.— Ridge capping is to be of 24g. "Queen's Head" Galvanized Iron or Zincanneal sheet, formed from 18" wide strips, 6' or 8' lengths. Ridge capping is lapped at least 6" at the joints, and securely fixed in position, in conjunction with the roofing sheets.

EAVES GUTTERS.— Eaves gutters shall be provided, these to be 4½", 24g. "Queen's Head" Galvanized Iron or Zincanneal beaded edge quadrant type, 6'—8' lengths. Fix in position with required falls to outlets; lap, double rivet and solder joints; secure to 6" x 1" fascia board with 16g. galvanized gutter brackets. Gutters are cut to receive thimble connections of downpipes, and should be properly soldered at these junctions. Provide galvanized wire gratings at downpipe outlets.

DOWNPIPES.— Provide and fix, where required, 24g. 3" diameter Galvanized Iron or Zincanneal rain water pipes in 6'—8' lengths, complete with all necessary bends, elbows and junctions. Downpipes are to be blocked out 1" clear of walls, and to be painted prior to fixing.

DOORS.— Provide two pairs of double doors and two single doors, as shown on drawing. Double doors to be 7' 6" x 4', hung from three heavy 12" "T" hinges. Doors are to be framed up in 5" x 2" hardwood stiles and ledges, and braced with 4" x 2" timbers, sheeted with 7' lengths of 8/3" corrugations Red Orb C.G.I. Single doors are to be 7' 6" x 2' 8", hung from three heavy 8" "T" hinges. Doors are to be framed up in 4" x 2" hardwood stiles and ledges, braced with 4" x 1" timber, and sheeted with 7' lengths of 10/3" corrugations Red Orb or C.G.I.

WINDOWS.—Provide windows, to dimensions as required, of the box-frame type.

PAINTING.—A galvanized iron roof will last longer, if the end and side laps of the sheet are painted, before fixing, with any good quality roof paint. Points of contact are where corrosion usually begins to develop.

LYSAGHT
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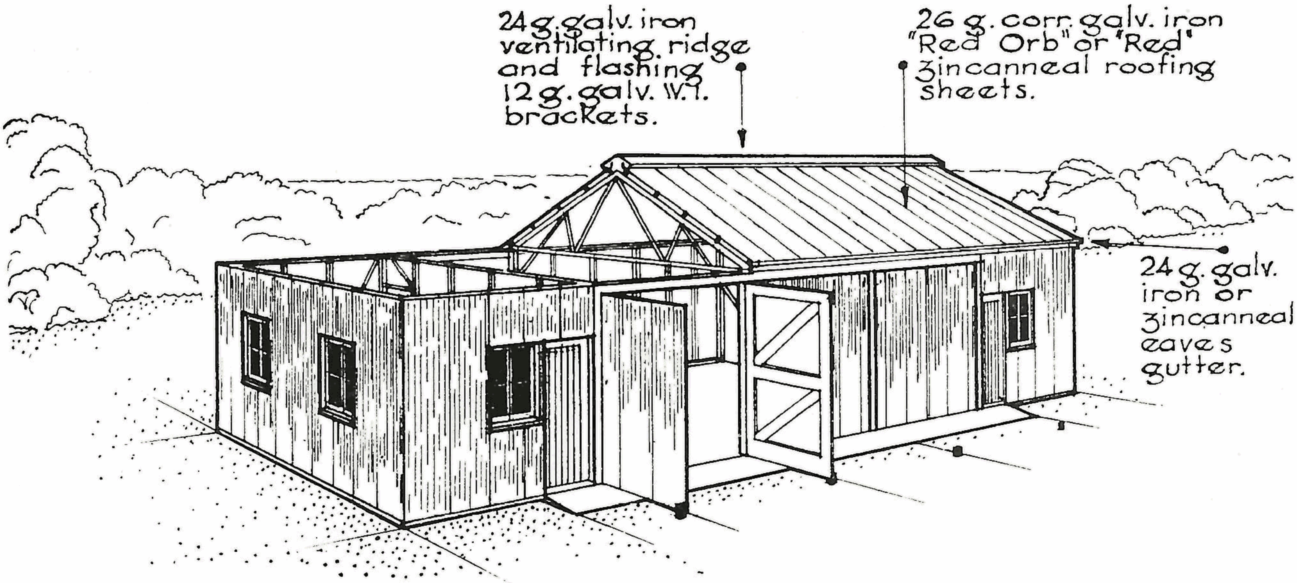
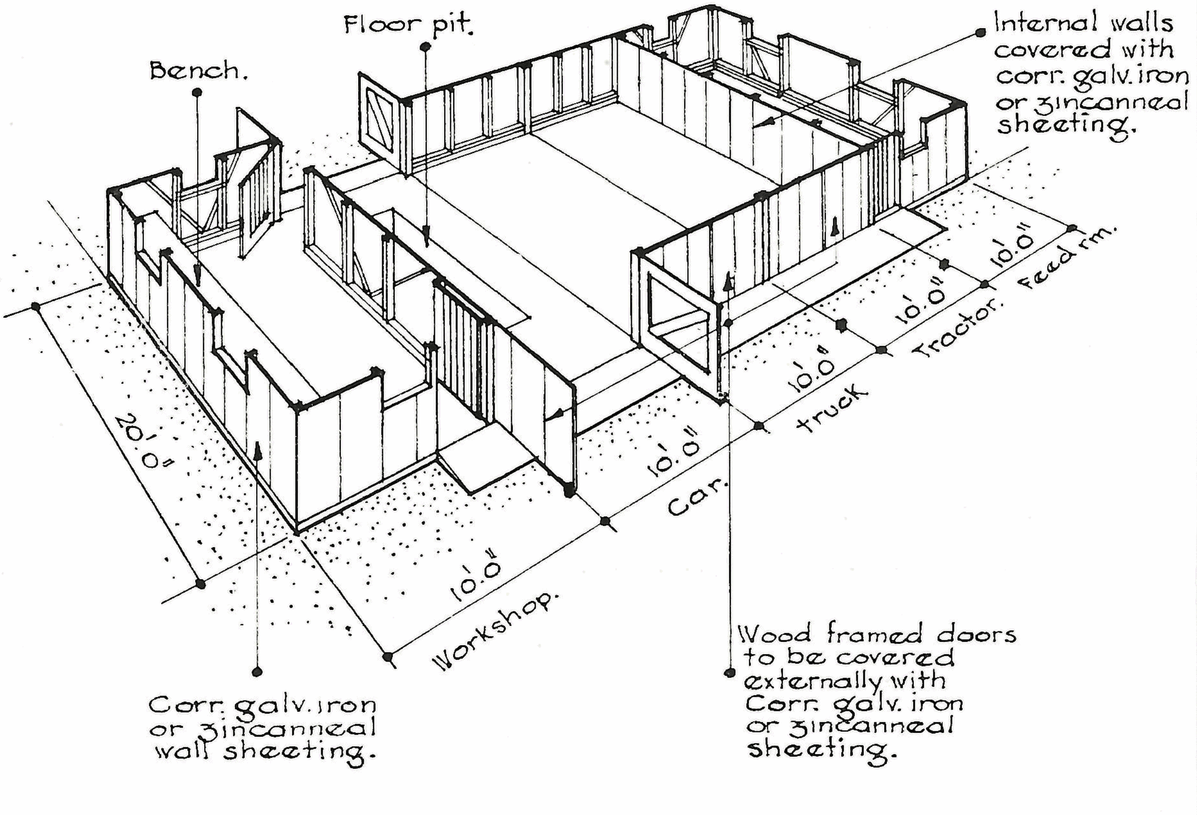
COMBINED WORKSHOP, IMPLEMENT SHED, AND FEED ROOM


24g. galv. iron ventilating ridge and flashing 12g. galv. W.I. brackets.
26 g. corr. galv. iron "Red Orb" or "Red" zincanneal roofing sheets.
24 g. galv. iron or zincanneal eaves gutter.


Floor pit.
Bench.
Internal walls covered with corr. galv. iron or zincanneal sheeting.
20'0"
10'0" Workshop.
10'0" Car.
10'0" truck
10'0" Tractor.
10'0" Feed rm.
Corr. galv. iron or zincanneal wall sheeting.
Wood framed doors to be covered externally with Corr. galv. iron or zincanneal sheeting.

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FARM BUILDINGS SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4126

COMBINED WORKSHOP, IMPLEMENT SHED, AND FEED ROOM

GENERAL.— The combined workshop, implement shed, and feed room, as indicated in the sketch overleaf, shows a suitable building, designed to combine the various functions of shed construction so often required by the property owner. It should be appreciated that the building, as specified, will not be suitable for all requirements, but it is intended to be a type from which a structure can be developed suitable to the individual owner's desires for his particular property.

Being of light timber and sheet steel construction, the cost will be low, compared with the accommodation required. The construction is such that the average farm carpenter will have no difficulty in erecting this building.

FLOOR.— Although in many country districts the soil will be suitable for compacting into a hard floor, in the majority of cases the placing of a 4" concrete floor slab will well repay the owner the initial expense and trouble. This slab should be of 5:3:1 concrete mix, graded to fall towards exits of the shed. It is normal to provide an inspection pit in one bay; the latter should be 4'-6' long, 3' wide, 3' 6" deep, the walls to be of 6" concrete. It is advisable for a sump 12" x 12" x 12" to be formed in the bottom of the pit, to enable any water to be bailed out as it accumulates. The sump should be covered with a W.I. grating, or suitable detachable wooden covering.

The wall plates are carried on 4" thick, 4"-6" high dwarf walls, in which are set ½" diameter rag bolts. The concrete floor should be laid some 4"-6" above the surrounding ground, and the floor carried out in a gradual ramp from the vehicle doors to a distance of 4'-5' from the shed.

WALL FRAMING.— The walls are framed up with 4" x 4" hardwood corner, door studs, and truss supporting studs, at 10' centres. 4" x 2" intermediate studs are provided at 2' centres, halved into 4" x 2" top and bottom plates, bottom plates being bolted to dwarf walls by ½" rag bolts. Provide a 6" x 3" hardwood plate over the double doors. Provide 3" x 2" noggings 5' from floor, and fixed between studs, as nailing pieces for wall sheeting. Wall framing is to be braced diagonally with 3" x 1" diagonal braces, checked into studs.

ROOF FRAMING.— Roof trusses are to be framed up in 4" x 2" hardwood timbers throughout. Each joint in the truss is to be secured with ⅝" diameter bolts, with square washers. Principal rafters are to be bird's-mouthed over plates and strapped with 16g. 1" galvanized strap. A 4" x 2" knee brace is to be bolted to vertical 4" x 4" studs and to the bottom tie of each truss and to the principal rafters. Provide five equally spaced 5" x 2" purlins, supported by timber cleats, and spiked and secured with 1" 16g. galvanized strapping, taken down and around the principal rafters of the truss.

INTERNAL PARTITIONING TIMBERS.— Internal partitions are framed up in 4" x 2" top and bottom plates, 4" x 2" studs, 3" x 2" noggings, and 3" x 1" diagonal braces, where necessary.

WALL SHEETING.— The walls should be sheeted with 10' sheets of 26g. Lysaght's 10 x 3" corrugations Red Orb or Red Zincanneal, applied with a side lap of one corrugation. Sheets are secured with spring-headed roofing nails or galvanized screws and washers, to top and bottom plates and noggings, through the top of every second corrugation at the end of sheets, and three to each sheet at intermediate points.

For gable end, sheets are cut to the required size and end lapped 4".

ROOF SHEETING.— The roof is sheeted with 12' lengths of 26g. Lysaght's 10 x 3" corrugations Red Orb or Zincanneal, applied with a side lap of 1½ corrugations. Sheets are fixed with spring-headed roofing nails or galvanized screws and washers, through the top of every second corrugation at ends of sheets, and through the top of every third corrugation at intermediate battens.

VENTILATING RIDGE.— Provide and fix moulded ventilating ridge of 18" ridge capping, 9" flashings, moulded to size required and fixed to roof with 1" x 12g. galvanized iron brackets, at 3' centres. Ridging is to be supplied in 6'-8' lengths of 24g. Queen's Head galvanized sheet, lapped at least 6" at the joints. Brackets and flashings are secured to battens in conjunction with roofing sheets, using galvanized screws and lead washers, or spring-headed roofing nails, through the top of every second corrugation.

EAVES GUTTERS.— Eaves gutters shall be provided, these to be 4½" 24g. Queen's Head galvanized iron or Zincanneal beaded edge quadrant type, 6'-8' lengths. Fix in position with required falls to outlets; lap, double rivet and solder joints; secure to 6" x 1" fascia board with 16g. galvanized gutter brackets. Gutters are cut to receive thimble connections of downpipes, and should be properly soldered at these junctions. Provide galvanized wire gratings at downpipe outlets.

DOWNPIPES.— Provide and fix, where required, 24g. 3" diameter Queen's Head or Zincanneal sheet rain water pipes, in 6'-8' lengths, complete with all necessary bends, elbows, and junctions. Downpipes are to be blocked out 1" clear of walls, and to be painted prior to fixing.

LINING.— The division wall between the vehicle portion of the shed and the grain room is sheeted with 24g. galvanized iron or Zincanneal sheets, lapped 2" and nailed to studs and noggings with ¾" clouts. Care has to be taken that all apertures in the grain room are blocked for vermin-proofing. Ceiling should be lined with 24g. sheet, leaving a 12" x 24" aperture centrally, covered with rust-proof fly wire.

DOORS.— Provide twin doors and single doors, as listed below:—

Four sets of twin doors, 10' x 5', as shown, hung from three heavy 12" hinges, to swing through 180°. Doors are to be framed with 6" x 2" hardwood styles and ledgers, braced with 4" x 2" hardwood braces. Doors are to be sheeted externally with two 10' lengths of 10 x 3" corrugations 26g. Red Orb corrugated galvanized iron.

Three doors, 7' x 2' 6", hung from three heavy 6" hinges. Doors are framed with 4" x 2" hardwood styles and ledgers, and braced with 4" x 1" timbers, sheeted with 7' lengths of 10-3" corrugations, 26g. Red Orb corrugated galvanized iron.

WINDOWS.— Provide windows, to dimensions as required, of the box-framed type.

PAINTING.— A galvanized iron roof will last longer if the end and side laps of the sheets are painted with any good quality roof paint. Points of contact are where corrosion usually begins to develop.

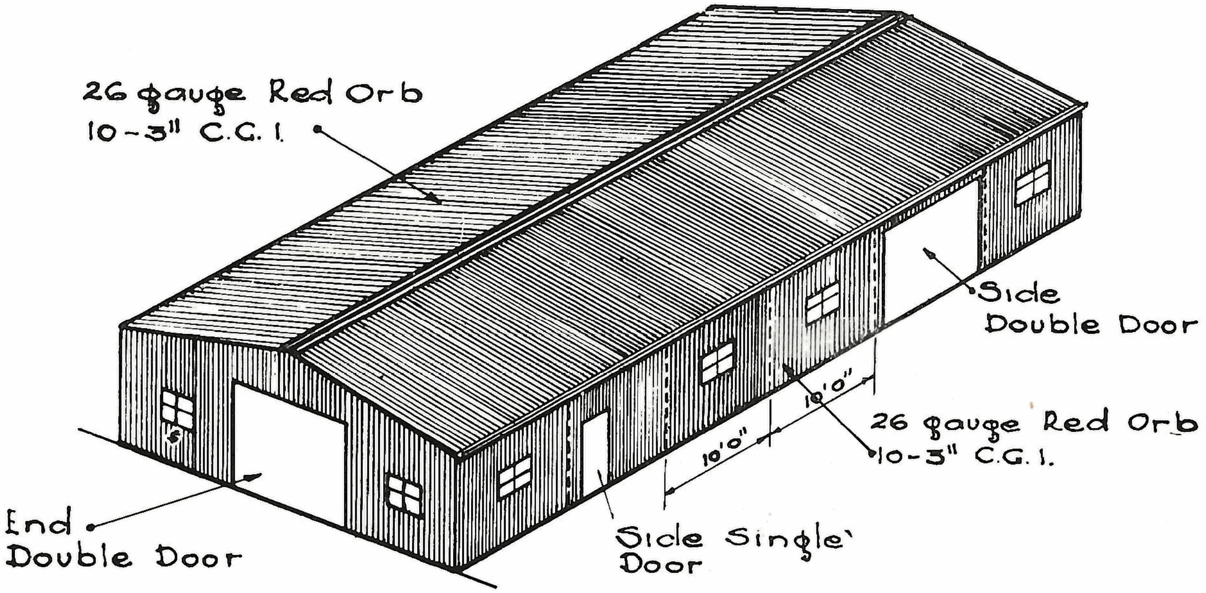
JOHN LYSAGHT (AUST.) PTY. LTD.

FARM BUILDINGS SECTION

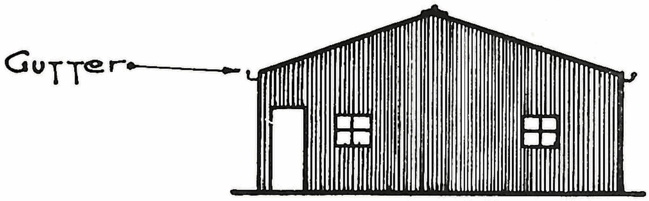
LYSAGHT'S COUNTRY SERVICE

SHEET 4132

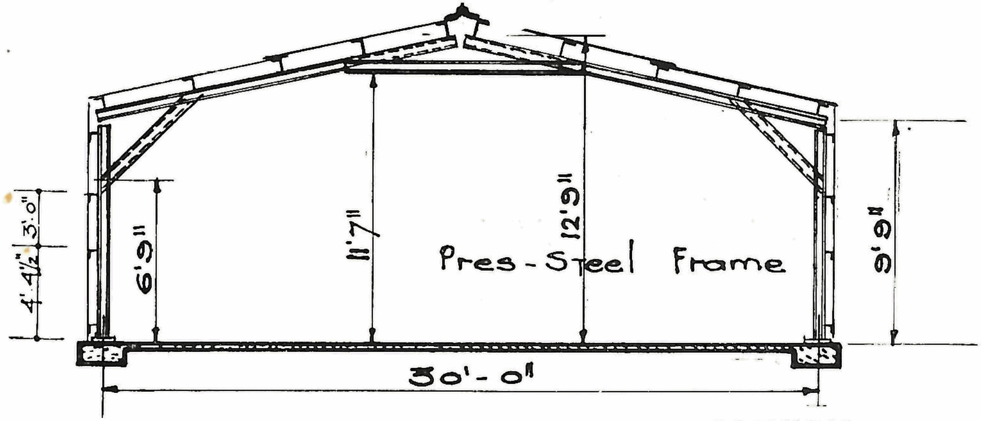
ARMCO 30'-SPAN "PRES-STEEL" BUILDING



ISOMETRIC VIEW



ALTERNATIVE END VIEW



SECTION

JOHN LYSAGHT (AUST.) PTY. LTD.

FARM BUILDINGS SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4132

ARMCO 30'-SPAN "PRES-STEEL" BUILDING

GENERAL.—Armco "Pres-Steel" prefabricated buildings are ideally suited for general utility buildings on the farm or station. Of the various sizes, the 30' x 60' type, illustrated overleaf, is the most popular. The door opening provided in the ends is large enough to allow the entry of trucks, etc. The building has a side wall height of 9' 9", a clear height of 11' 6" at the centre, and the width of the building is 30', measured from centre to centre of outside columns. All the parts are clearly marked and ready for immediate assembly when once the concrete floor and footings have been prepared. The preparation of the floor footings and the assembly of steel work can readily be followed from the drawings and instructions supplied with each building.

FLOOR AND FOUNDATIONS.—A concrete floor 4" deep is recommended, with concrete footings 12" deep under each main column and end wall column, of varying widths, as shown on the drawings. The concrete should be of 5:3:1 mix, properly tamped to minimum dimensions and allowed to stand for three days before erecting steelwork. It will be necessary, while pouring, to set 10" x ¾" diameter holding down bolts for anchoring columns, the exact position of each being located on the foundation drawing. The floor and footings should be on a level foundation, and the holding down bolts located exactly while the concrete is wet to ensure easy and accurate erection of the steel work.

FRAMEWORK.—The main frames are spaced at 10' centres (the building may be obtained in any multiples of 10' as required), and are assembled from prefabricated Armco 30' span building units, which are manufactured to the following dimensions:—

Columns—4½" x 1¾" x 3/16" pres-steel channels.
Rafters—4½" x 1¾" x 3/16" pres-steel channels.
Apex tie—4½" x 1¾" x 3/16" pres-steel channels.
Knee brace—3¼" x 1⅝" x 5/32" pres-steel channels.
Apex gusset—3/16" flanged plate.
Knee gusset—3/16" flanged plate.

The connections of all these members are made with Armco patent self-centreing dimple joints with ⅝" diameter bolts and spring washers. It is recommended that these frames be assembled on the ground before being raised to the vertical.

The purlins and girts are manufactured of 2-3/16" x 2-3/16" x 3/16" angles and field-bolted to the frames by way of a field-bolted angle cleat. ⅝" diameter bolts are used in these connections.

The end wall columns are manufactured from 4½" x 2⅜" x 3/16" channels, and are bolted to the floor and rafters, while a raking girt bolted to the underside of purlin cleats provides a member as a finish for the end wall sheeting.

Window mullions of a 3" channel section are bolted between girts at the sides of each window to provide an opening 3' high x 4' wide.

Sway bracing consists of 2" x ¼" flats in roof and walls bolted to the rafters and columns with ⅝" diameter bolts.

WALL SHEETING.—The walls are sheeted with 10' lengths of 26g. Lysaght's 10 x 3" corrugations Red Orb or Red Zincanneal sheeting. Sheets are lapped one corrugation and fixed through the crest of every third corrugation at junction with girts, using standard ¼" diameter hook bolts. Sheets are cut to size to fit gable ends, round window frames, doors, etc.

ROOF SHEETING.—The roof is sheeted with 8' and 9' lengths of Lysaght's 26g. 10 x 3" corrugations Red Orb or Red Zincanneal sheet, fixed with side lap of 1½ corrugations and a minimum end lap of 9". Sheets are secured to angle girts with ¼" diameter hook bolts pierced through the top of every second corrugation at end laps, and three to each sheet at intermediate purlins.

RIDGING.—Fix and provide 24g. Queen's Head galvanized or Zincanneal sheet 18" ridge capping in lengths of 6' or 8', lapped 6" and securely fixed in position in conjunction with the roofing sheet to the purlin, with 3/16" diameter galvanized hook bolts and washers.

Alternatively, special ventilating ridge capping can be fixed in accordance with the manufacturers' instructions.

GUTTERING.—Eaves gutters shall be of 5" x 24g. Queen's Head galvanized iron or Zincanneal beaded edge quadrant type, in 6'-8' lengths, fixed in position with required falls to outlets. Gutters are lapped, double riveted, soldered at joints, and secured to steel fascia plate 7" deep with 16g. galvanized gutter brackets bolted to fascia plate with ¼" diameter galvanized bolts in 2½" x 5/16" slots which allow for fall. Cut gutters for receiving thimble connection and downpipes, and properly solder at these junctions. Provide galvanized wire gratings at all downpipe outlets. Properly construct all stop ends, mitres, etc.

DOWNPIPES.—Provide and fix at ends 24g. 3" diameter galvanized iron or Zincanneal rain water pipes in 6'-8' lengths, well entered and soldered at joints, complete with all necessary bends, elbows, junctions, etc. Downpipes shall be secured with 16g. straps bolted to wall sheets with two ¼" galvanized bolts and washers, spacing of same to be two to each length of pipe. Downpipes are to be blocked out 1" clear of walls, and are to be painted prior to fixing. Downpipes shall be connected at head to thimble connections, with crimped bends, straight elbows, or swan-neck bends, and arranged to despatch into tank storage or rubble disposal drain as required.

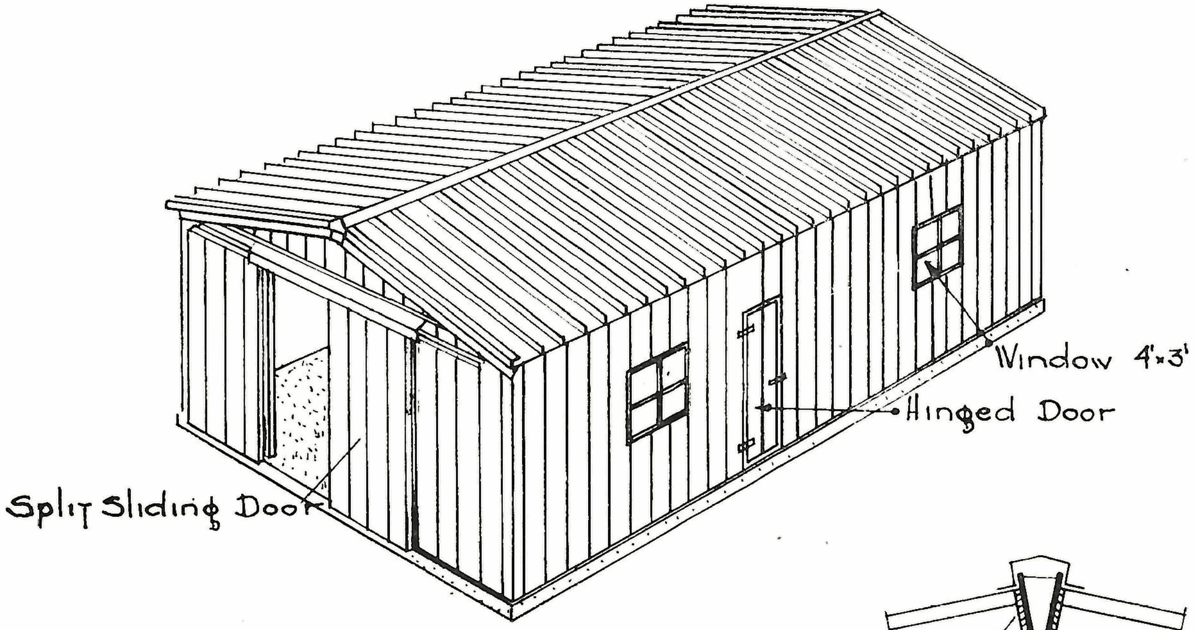
DOORS.—Fix a 10' 9" wide x 10' high double-swung door as provided in one end ready to assemble on the end wall columns. This door may be at either or both ends. A 9' 4" x 9' 4" double-swung door can also be provided in the sides.

Access doors 3' wide x 7' 4" high can also be provided in either sides or ends of the building. All doors are to be covered with 26g. corrugated galvanized iron, bolted to the doors with ¼" hook bolts.

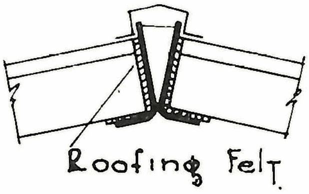
WINDOWS.—Window openings may be placed around the building to suit local conditions or to suit the purpose for which the building is required. These windows are 4' x 3' steel framed, either fixed or top-hung opening type, provided with the necessary glass, putty, and fastenings to fix to the girts. Flashing is provided at the heads and sills of each window by forming 24g. galvanized iron to shape.

PAINTING.—All steel work receives one coat of shop paint before delivery, and should be painted after assembly with one coat of light grey or aluminium paint. A galvanized iron roof will last longer if the end and side laps of the sheets are painted before fixing with zinc dust paint, red oxide, or any good quality roof paint. These points of contact are where corrosion usually begins.

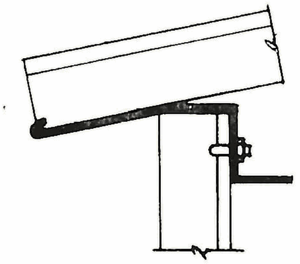
ARMCO "STEELOX" BUILDING



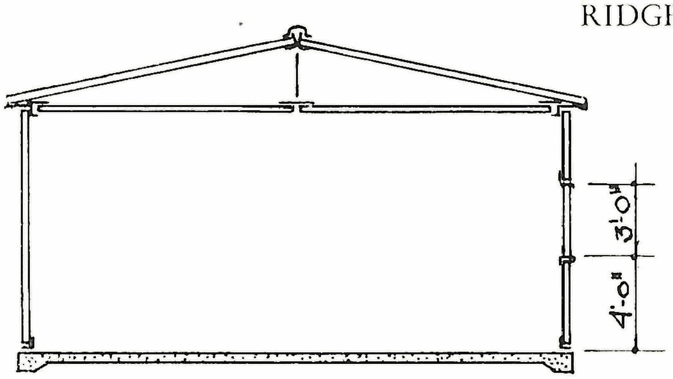
GENERAL VIEW



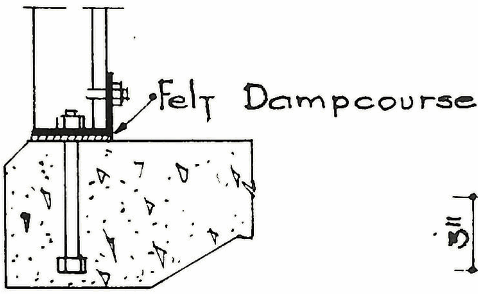
RIDGE



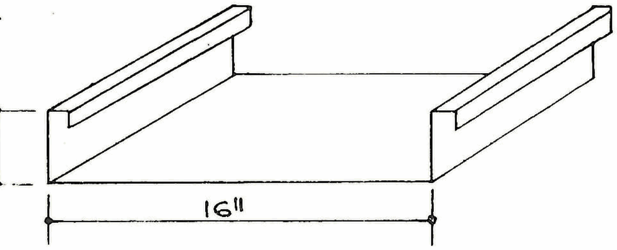
EAVES



SECTION



BASE



TYPICAL PANEL

FARM BUILDINGS SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4135

ARMCO "STEELOX" BUILDING

GENERAL.— The Armco "Steelox" building is designed as a general purpose structure, being equally suitable as a garage, machinery shed, small store, workshop, pump house, farm building, or temporary accommodation. It consists basically of a variable number of interlocking preformed panels, assembled to form walls and roof. Varying widths and lengths of building may be built, and doors and windows placed at will.

SIZE.— The design, illustrated overleaf, is for a farm shed or general storage building, in any area, without any interior finish. The dimensions, as shown, are 22' 8" wide, 40' long, with an eaves height of 10' and an apex height of 12' 2". The length can be varied in multiples of 4'. The manufacturers intend that buildings will be manufactured to the following dimensions:—

Side wall heights—8', 10', 12'.
Widths—10' 8", 14' 8", 18' 8", 22' 8".
Lengths—16' minimum and in multiples of 4'.

PANELS.— By folding sheet steel, structural strength is obtained, and by exploiting this theory, Armco "Steelox" folds the edges of 20g. steel sheet into a series of angles and channels, which, when the sheets are interlocked, creates an efficient structural load-bearing wall or roof. Steel sheets used are either Lysaght's Zincanneal or tight-coated galvanized Queen's Head flat sheet.

The main panel unit, used in wall and roof alike, is that illustrated overleaf as "typical panel," which is a panel 16" wide with 3" ribs, the 16" face forming the exterior sheeting or roofing, and the interlocking ribs forming the structural framework. The length of sheet is according to the dimensions of the building. Special corner panels are provided for corners, short panels for doorways, windows, and gable ends.

FOUNDATIONS AND FLOORS.— The wall footing and floors are to be concrete of a 4:2:1 mix, properly tamped to the minimum dimensions of 6" under the walls, tapered to 4" for the floor, and bevelled on the outside edge to shed the water. During the pouring, it will be necessary to set holding down bolts of ½" diameter x 6" long, to anchor the base angle, the location of these bolts being fixed by using the base angle as a template.

BASE ANGLES.— Base angles are provided to take the wall panelling. A bituminous felt dampcourse is set in bituminous mastic compound on the concrete foundations, and the top side of the felt dampcourse is dressed with mastic compound. The base angles are then set and bolted in the correct position.

WALL PANELLING.— Corner wall panels, standard wall panels, and short wall panels are erected in conjunction with Armco's top plate clip unit, which is formed from 12g. zinc-coated sheet. The top plate clip unit has a series of holes to facilitate fastening, and interlocking sheets are fastened to both base angle and top plate clip with ⅜" diameter hook bolts. While the panels are being erected, the contact surfaces of the interlocking ribs are painted with a bituminous compound.

ROOF ASSEMBLY.— Roof panels (which are of the same section as wall panels, viz., 16" x 3") are joined to the wall panels with a top plate clip, described above. The joint at the apex is to be formed by the use of Armco's ridge unit, formed from 12g. zinc-coated sheets, and the roof panels are to be bedded thereto with bituminous mastic compound and bituminous felt.

The ridge is to be finished with a formed ridge capping of 20g. zinc-coated sheet, with stopped ends, fastened to the ribs of the roof panels with self-tapping screws.

A formed barge mould of 20g. zinc-coated sheet is used to finish the junction of the roof and end walls, and fastened thereto with self-tapping screws.

SWAY BRACING.— Sway bracing is provided in the plane of the top plate clip, and consists of 12g. zinc-coated strips, formed into angle and channel sections. This bracing is supported from the ridge with hanger rods, at 12' centres, and is connected to end wall girts, top plate clip, and to each other, with 12g. galvanized sheet gussets. Fastenings are standard ½" diameter bolts and nuts.

DOORS.— As shown in the table, doors are of three types, positioned in either ends or the sides of the buildings.

1. Sliding doors are of either single-leaf or double-leaf type. The doors are assembled from "Steelox" panels with 12g. trimming pieces. The doors slide on the outside of the building and cover an opening framed with 12g. door jambs and lintels.
2. Swing door, double-leaf type, assembled from "Steelox" panels with 16g. trimming pieces.
3. Swing door, single-leaf, shop assembled.

Type	Width of Opening	Height of Opening	Assembly
Sliding door	9' 6" or 10' 9"	11" less than side wall height	On site
Swing door Double-leaf	9' 4"	7' 6" in 8' wall 9' 6" in 10'-12' wall	On site
Swing Door Single-leaf	3' 3"	7' 0"	Shop Assembled

WINDOWS.— Fit 4' x 3' steel-framed windows, of either fixed or top-hung opening type, into openings, provided and glazed with glass, putty, and clips, as supplied. These windows can be located in varying positions, as required. The openings are to be provided with 12g. pressed steel lintels and heads, and the sashes are to be fixed with ¼" diameter bolts.

EAVES GUTTERS.— Provide and fit a 4" x 24g. Queen's Head galvanized iron or Zincanneal beaded edge quadrant type gutter, in 6'-8' lengths, fixed in position with required falls to outlets; lapped, double riveted, soldered at joints, and secured to steel gutter clips with 16g. galvanized gutter brackets, and ¼" diameter bolts. (These gutter clips are provided and bolted to the top plate clips at 2' 8" centres, with ¼" diameter countersunk bolts.)

DOWNPIPES.— Provide and fix at ends 24g. 3" diameter round galvanized iron or Zincanneal rainwater pipes in 6'-8' lengths, well entered and soldered at joints, and complete with all necessary bends, elbows, junctions, etc. Downpipes shall be secured with 16g. straps, bolted to wall sheets with two 3/16" galvanized bolts and washers, spacing of same to be two to each length of pipe.

INTERIOR FINISHES.— The shed above does not include interior finishes, but any interior finish can be applied to Armco "Steelox" framing by first nailing battens to the inside ribs with Helyx nails.

PAINTING.— As noted, during assembly, all interlocking ribs and contact surfaces are to be painted with a bituminous paint, care being taken to apply this neatly. After assembly, all steelwork is to be painted with two coats of an approved paint.

NOTE.— No attempt has been made to go into exhaustive details of the component parts of the building, as the manufacturer supplies the information required for preparing the base and for erection of the steelwork in a comprehensive folder of erection instructions and drawings, supplied with each building.

LIST OF QUANTITIES

BUILDING.— One complete building of Armco prefabricated "Steelox" 22' 8" span, length 40'.

GUTTERING AND DOWNPIPES.— (For building 40' long):
4½" x 24g. quadrant guttering—90'.
3" dia. x 24g. downpiping (with bends)—44'.

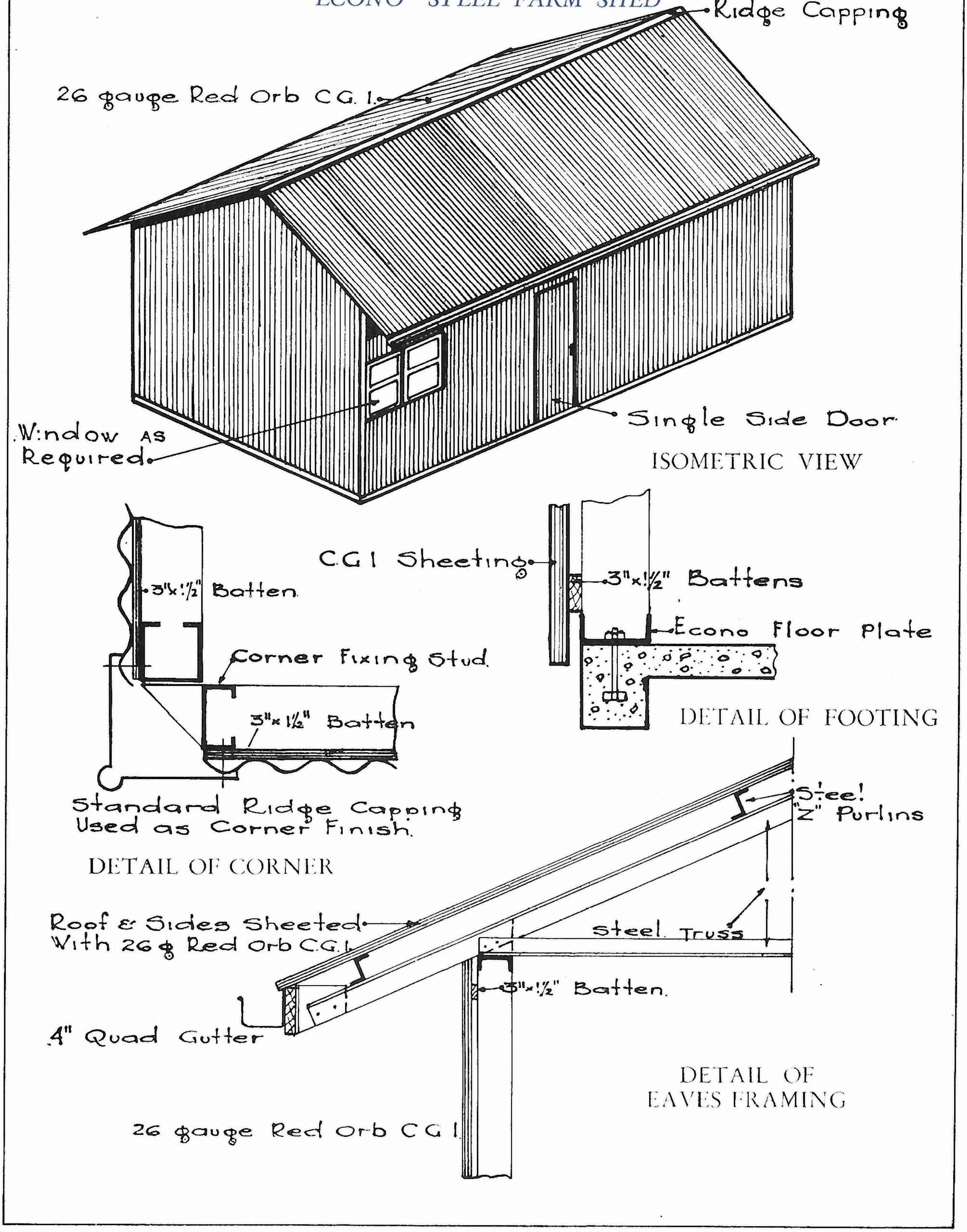
CONCRETE.— (For building 40' long):
13 cubic yards of 4:2:1 concrete.

FARM BUILDINGS SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4136

"ECONO" STEEL FARM SHED



ISOMETRIC VIEW

DETAIL OF FOOTING

DETAIL OF CORNER

DETAIL OF EAVES FRAMING

FARM BUILDINGS
SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4136

"ECONO" STEEL FARM SHED

GENERAL.—"Econo-Steel" is a building frame technique, developed by Tulloch's Pty. Ltd., for domestic and farm building construction. This system of framing is an oversized "Meccano" set in its simplicity, sheeting and lining being nailed directly to the "Econo-Steel" studs, with the utmost security. This data sheet is produced to illustrate this form of construction, namely, a 24' x 12' frame, which may be lined and roofed to provide a general storage shed.

Due to the spacing of "Econo-Steel" studs (Tulloch's provide for a 3' and 4' module), various combinations of widths and lengths can be made, to suit the individual taste. The width of any building is controlled by the fact that the roof trusses are provided in widths of 10' 6", 12', 13' 6", 15', 18', 21', and 24'.

Vertical stud members in "Econo-Steel" are provided, to allow of two ceiling heights—7' 11" and 9' $2\frac{1}{2}$". Provision is made with short studs to accommodate doors or window head trim, at 6' 9" from the floor, and three heights for window trims of approximately 1' 3", 2' 8", and 3' 6" from the floor level.

FOUNDATIONS.—Before setting out the foundations on which the proposed "Econo-Steel" frame is to be erected, it is essential to work to Tulloch's steel plan and to build the foundations square, true and level.

FLOORING.—Flooring may be in three forms:—

T. and G. timber flooring, nailed to timber bearers and joists.

Timber flooring on steel bearers and joists for areas exposed to white ant attacks.

Concrete.

In the shed illustrated overleaf, a 4" concrete floor slab is laid of dimensions corresponding to overall dimensions of steel frame. Underneath the floor plate, the thickness of concrete is increased to approximately 9". Holding down bolts, 3" x $\frac{3}{8}$" diameter, are built into the concrete at 3' centres, 1" of thread being allowed to protrude. Nuts should be left on the bolts at the time of concreting.

A damp course of impregnated paper should be laid between the floor and bottom plate.

WALL FRAMING.—"Econo-Steel" wall framing is assembled to manufacturers' specifications:—

Bottom and top plates of pressed 16g. steel channel section, $3\frac{1}{2}$" x 2".

Pressed 16g. steel box section studs:—

$3\frac{1}{2}$" x 3" load-bearing or heavy studs.
$3\frac{1}{2}$" x $1\frac{1}{2}$" non-load-bearing or light studs.

Studs are placed at 18" centres in the building shown, and are tenoned and clamped into top and bottom wall plates. Plates are spliced, where required.

Bottom plates are to be securely fixed to floor by $\frac{3}{8}$" diameter bolts, set in concrete.

Nail on to "Econo-Steel" studs, top, bottom and middle battens of 3" x $1\frac{1}{2}$" hardwood, to provide fixing for vertical corrugated steel sheeting.

ROOF FRAMING.—The roof is to be framed with "Econo-Steel" roof trusses, spaced at 6' centres, to support corrugated galvanized iron with either steel or wooden purlins. Purlins are to be 3" x 2" hardwood timber, as shown, to span two trusses, or alternatively, these can be 2" x 2" x 2", 16g. "Z" section "Econo-Steel" roof purlins.

GABLE FRAMING.—The gable is framed with standard "Econo-Steel" gable framing, to correspond with standard trusses used. Provision is made in gable framing for end louvres, if required. Nail to vertical studding, 3" x $1\frac{1}{2}$" timber girts, to provide fixing for wall sheeting.

WALL SHEETING.—The walls are to be sheeted with 9' sheets of 26g. Lysaght's 10 x 3" corrugations Red Orb or Zincanneal, applied with a side lap of one corrugation. Sheets are secured with spring-headed roofing nails or galvanized screws and washers to the girts, through the top of every second corrugation at the ends of sheets, and three to each sheet at intermediate points.
For gable end, sheets are mitre-cut to the required size and end lapped 4".

ROOF SHEETING.—The roof is sheeted with 8' lengths of 26g. Lysaght's 10 x 3" corrugations Red Orb or Zincanneal, applied with a side lap of $1\frac{1}{2}$ corrugations. Sheets are fixed with spring-headed roofing nails or galvanized screws and washers, through the top of every second corrugation at the ends of sheets and every third corrugation at intermediate points.

RIDGE CAPPING.—Either standard ridging or ventilating ridging can be fixed to the shed illustrated. The ridge capping, as shown, is of standard type, formed from 18" wide strips of Queen's Head flat sheet, applied in 6'-8' lengths, lapped at least 6" at the joints and fixed to the battens, in conjunction with the roof sheeting.

EAVES GUTTERS.—Provide eaves gutters of $4\frac{1}{2}$" 24g. Queen's Head galvanized iron or Zincanneal, beaded edge quadrant type. These are provided in 6'-8' lengths, fixed in position with required falls to one end of the shed, lapped, double riveted, and soldered at joints. Guttering is secured to a fascia board of 6" x $1\frac{1}{2}$" timber, secured to fascia cleats of the roof truss. Gutters are cut to receive thimble connections of downpipes, and are properly soldered at these junctions.

DOWNPIPE.—Provide 24g. 3" diameter Queen's Head galvanized sheet downpipe, with the necessary bends and joints to carry water from both sides of the shed to water storage tanks.

DOORS.—Doors are to be 6' 8" x 2' 8", and framed up with 4" x 2" stiles and rails, braced with 3" x 2" hardwood, and sheeted on outside with one sheet of Lysaght's Red Orb 10 x 3" corrugations galvanized iron.

WINDOWS.—Windows are to be of the double-hung box frame type, standard construction.

NOTE.—A galvanized iron roof will last longer if the end and side laps are painted, before fixing, with any good quality roof paint. The points of contact are where corrosion usually begins.

LYSAGHT
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AUSTRALIA

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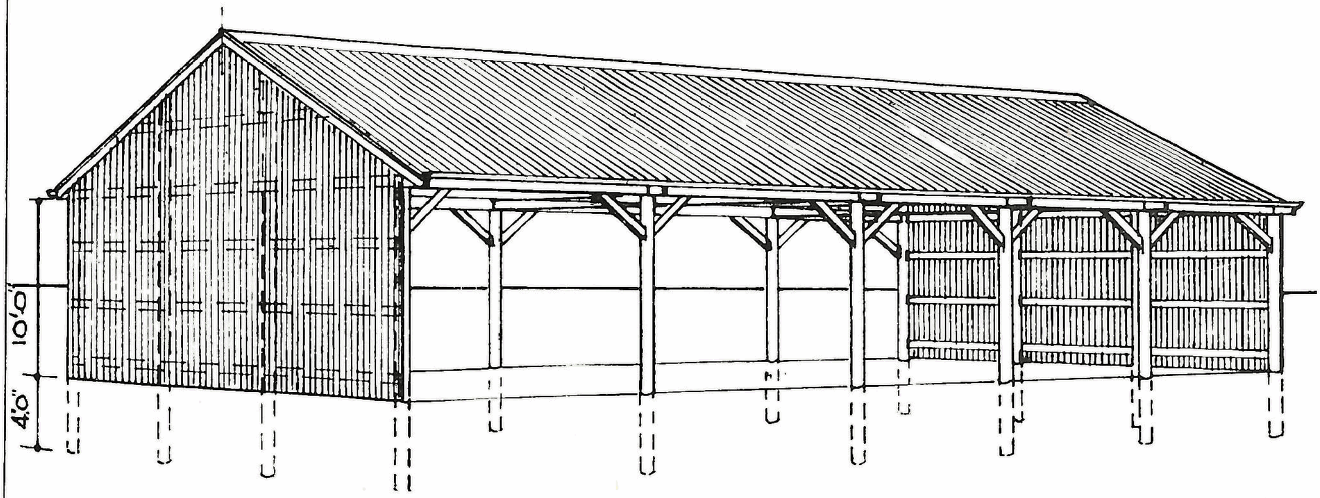
FARM BUILDINGS
SECTION

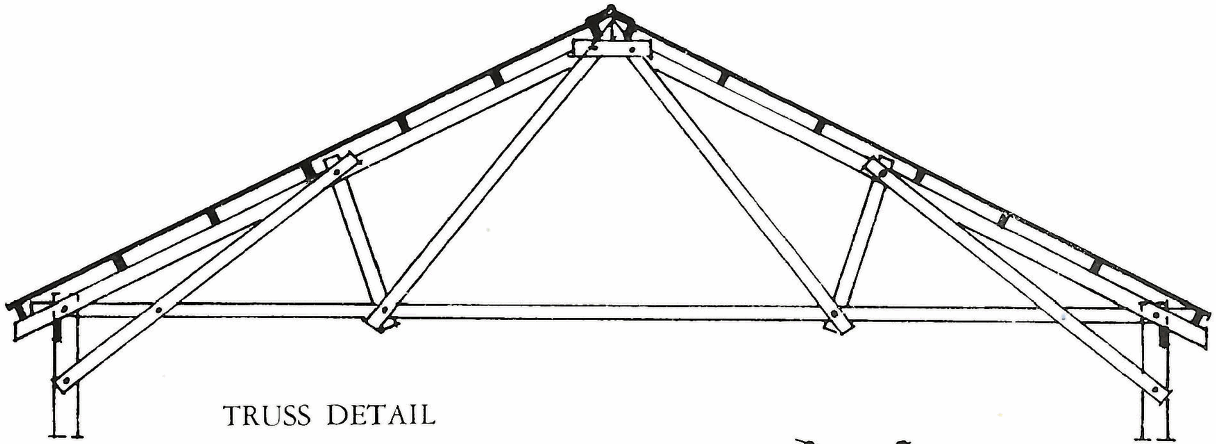
LYSAGHT'S
COUNTRY SERVICE

SHEET 4142

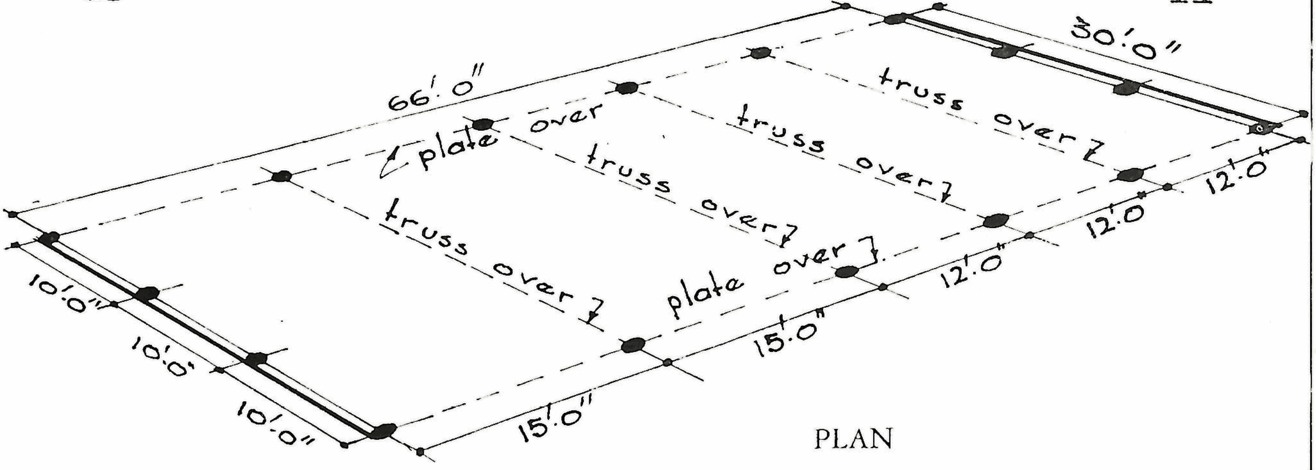
IMPLEMENT SHED



PERSPECTIVE VIEW



TRUSS DETAIL



PLAN

JOHN LYSAGHT (AUST.) PTY. LTD.

FARM BUILDINGS SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4142

IMPLEMENT SHED

GENERAL.— The design for an implement shed, as shown overleaf, provides for a building of five open bays, roofed with Lysaght's steel sheet, fixed to cypress pine or hardwood framing, on round bush timber posts. The actual distances between posts depends upon implements to be sheltered. In this suggested layout, two bays are of 15' span and three of 12' span. For wider headers (22', etc.), it is better to adopt a design as portrayed in Sheet 4145, where attachments can be towed in from the end of the shed. Alternatively, the design overleaf can be sheeted on one or two sides, the end framing columns dispensed with, and implements drawn in from the end.

FLOOR.—Floors are generally of earth, built up 6"-12" above the natural ground level and well rammed. Concrete floors can be provided, if necessary, but this is not advisable when tracked or spiked wheels are used.

POSTS.—Posts are to be of bush timber, not less than 6" diameter at the small end, and set a minimum of 3' in the ground. They should preferably be potted in a concrete blob footing, 18" diameter x 4' deep. The portion set in the ground and 2' above ground level is to be coated with creosote or a heavy coat of hot tar. Tops of posts are to be scarfed out to take top plates and bottom ties of trusses, posts being holed for $\frac{1}{2}$" bolts. Posts should be free from bark before erection.

ROOF FRAMING.—The roof framing is constructed of a number of trusses, carried on posts and 6" x 3" hardwood or 9" x 3" cypress wall plates, secured to vertical columns with $\frac{1}{2}$" cup-headed bolts and nuts. 4" x 2" struts are placed under the wall plates and toed into plates and posts. Trusses are framed up in 4" x 2" scantlings, each joint in the truss to be secured with one or two $\frac{5}{8}$" diameter bolts with square washers. For ease of erection, these trusses should be fabricated on the ground in their entirety and lifted by pole and tackle into position. Trusses are placed in a position to correspond with post spacing. Knee braces of 4" x 2" timbers are placed in position after assembly.

Provide 5" x 2" purlins over 12' bays, and 6" x 3" purlins over 15' bays. All joints of purlins with principal rafters, and joints of principal rafters with plates, are to be strapped with 1" galvanized strip.

END FRAMING.— The ends are framed up with posts 6" diameter at the small end, at 10' centres. These carry 4" x 2" girts at a maximum of 4' centres.

ROOF SHEETING.— The roof is to be sheeted with 9' lengths of 26g. Lysaght's 10 x 3" corrugations Red Orb or Red Zincanneal sheet, applied with a side lap of $1\frac{1}{2}$ corrugations and a minimum end lap of 6". Sheets are fixed with spring-headed roofing nails or galvanized screws and washers, through the top of every second corrugation at end points and through the top of every third corrugation at intermediate battens.

END SHEETING.— Ends are sheeted with 10' lengths of Lysaght's 26g. 10 x 3" corrugations Red Orb or Red Zincanneal sheet, applied with a side lap of one corrugation and a minimum end lap of 4". Sheets span three girts spacing, and are secured with spring-headed roofing nails or galvanized screws and washers, through the top of every second corrugation at end laps, and three to each sheet at intermediate battens.

RIDGE CAPPING.— The ridge capping should be of a standard type, formed from 18" wide strips of Queen's Head sheet, applied in 6'-8' lengths, lapped at least 6" at the joints.

EAVES GUTTERS.— It is considered that advantage should be taken of the large coverage of the shed to provide a catchment for the collection and storage of rain water. Provide eaves gutters of 6" 24g. Queen's Head galvanized iron or Zincanneal, beaded edge quadrant type. These are provided in 6'-8' lengths, fixed in position with required falls to one end of the shed, lapped, double riveted, and soldered at joints. Guttering can be secured to lowest purlin or a fascia board of 6" x $1\frac{1}{2}$" timber, secured to the ends of principal rafters. In both cases, the gutter is secured with 16g. galvanized brackets. Gutters are cut to receive thimble connections of downpipes, and are properly soldered at these junctions.

DOWNPIPES.– Provide 24g. 4" diameter Queen's Head galvanized sheet downpipe, with the necessary bends and joints to carry water from both sides of the shed to a 3,000 gallon corrugated iron storage tank.

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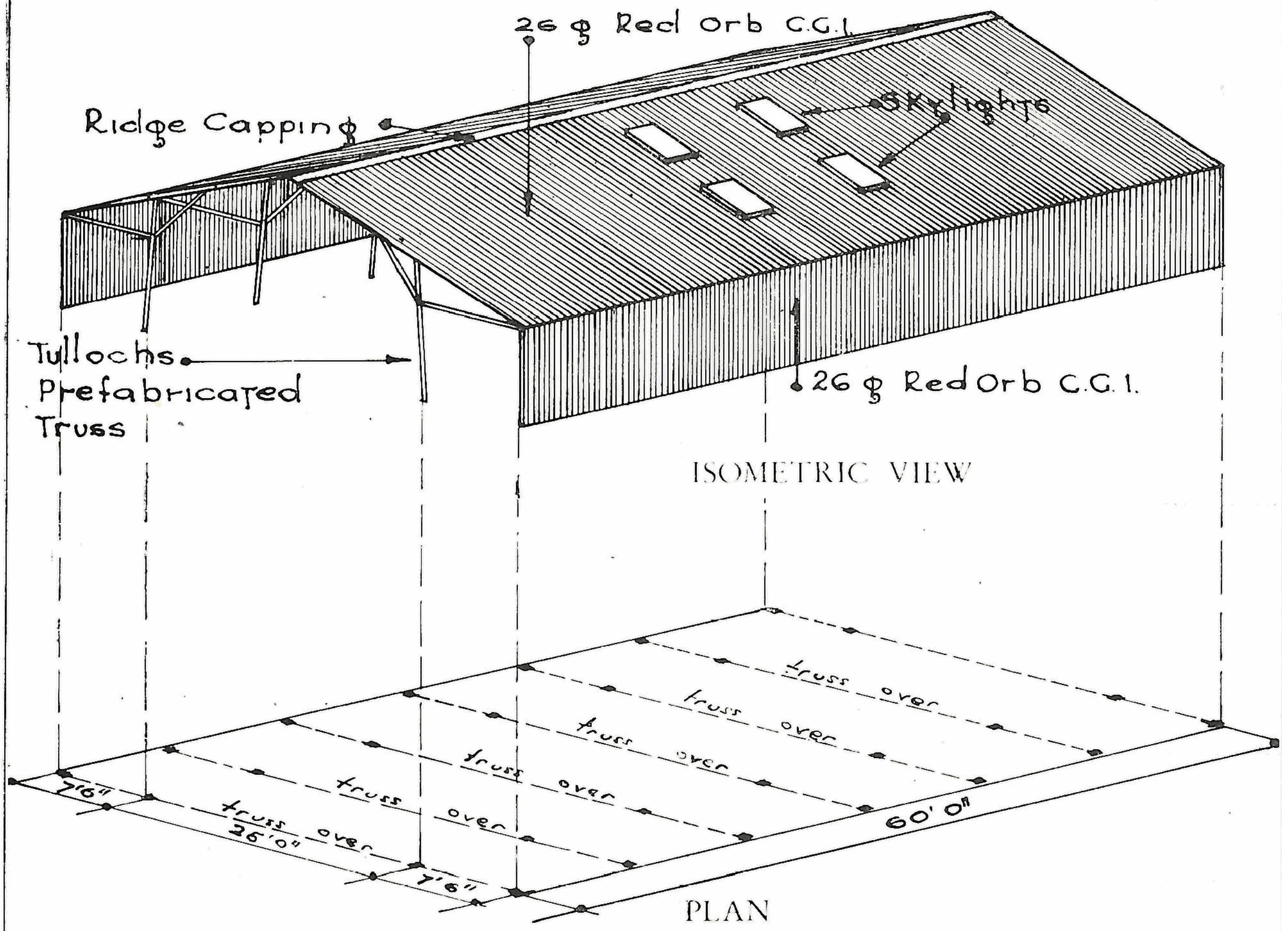
FARM BUILDINGS SECTION

LYSAGHT'S COUNTRY SERVICE

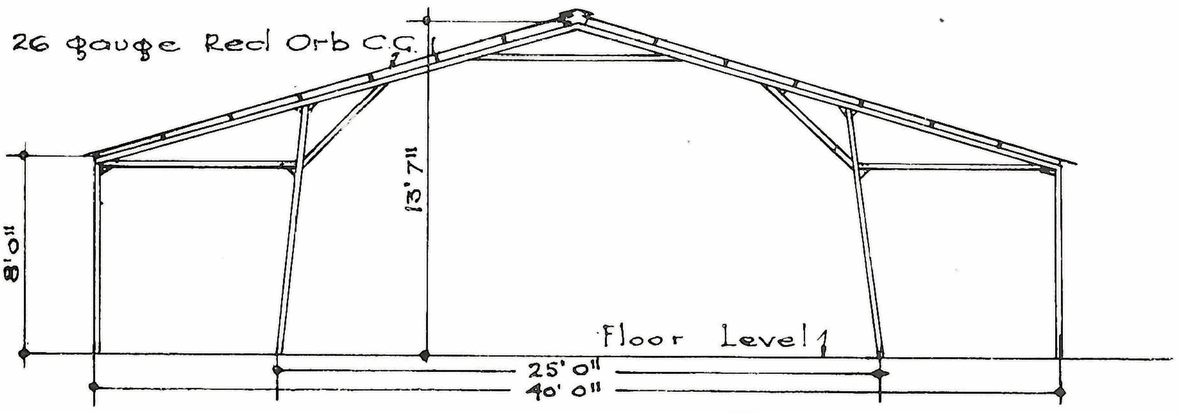
SHEET 4145

TULLOCH'S IMPLEMENT SHED



ISOMETRIC VIEW

PLAN



SECTION

FARM BUILDINGS SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4145

TULLOCH'S IMPLEMENT SHED

GENERAL.—This prefabricated, precision built framework of pressed steel lends itself to the construction of various farm sheds. Trusses, which include wall columns and roofing members, are provided, as a complete unit of construction, delivered in folded-up bundles, and assembly is purely a matter of extending the component parts of the trusses and bolting the whole framework together.

The shed may be sheeted to meet the requirements of the owner. As an implement shed to store machinery of dimensions not exceeding the distance between the trusses, i.e., 10', the ends are sheeted and the sides left open. On large farms, however, headers exceed 20' in width, and a suitable structure to contain such wide implements is illustrated overleaf, the sides being sheeted and the ends left open. Prime movers and attachments can be driven in at one end and the prime mover use one of the side bays as a roadway.

TRUSSES.—Trusses are of pressed steel, of a 40' span demountable type, manufactured from 10g. sheet steel. These fold up for transport into a parcel measuring 9' x 1' 6" x 6", and weighing 300 lb. per $\frac{1}{2}$-truss unit. When extended, trusses are placed at 10' intervals. The overall width of the truss is 40', with a central bay portion of 25'. Each truss weighs only 600 lb., and can be transported by means of normal motor truck or air transport.

FOUNDATIONS.—The steel frames are bolted to concrete footings, approximately 12" x 12" x 12" deep. These can either be poured before the trusses are erected with bolts in position, or the trusses can be assembled, placed in position, temporarily stayed, and concrete blob footings poured round the feet of the columns.

FLOORS.—Floors are generally of natural ground, built up 6"-12" above the surrounding country. A slab of 4" concrete (5:3:1 mix) may be poured in one side of the shed, if it is desired to use this for a work bench.

WALL FRAMING.—The height of the walls is such that 8' lengths of corrugated galvanized iron are fastened to three Tulloch's Special Z Section girts. Girts are fastened to columns with $\frac{3}{8}$" diameter bolts. End bays are trussed diagonally with steel angle pieces.

ROOF FRAMING.—The roofing sheets are clipped to Z-shaped pressed steel purlins. Sufficient fixing clips for roof sheeting are supplied with the prefabricated truss and purlin unit.

WALL SHEETING.—The walls are sheeted with 8' lengths of Lysaght's 26g. Red Orb 10 x 3" corrugations corrugated galvanized iron or Red Zincanneal, secured with roof clips to girts through the top of every second corrugation at end of sheets, and three to each sheet at intermediate points.

ROOF SHEETING.—The roof is sheeted with 12' lengths of 26g. Lysaght's 10 x 3" corrugations Red Orb or Zincanneal sheet, applied with a side lap of $1\frac{1}{2}$ corrugations, and a minimum end lap of 6". Sheets are clipped to steel purlins through the top of every second corrugation at end of sheets, and through the top of every third corrugation at intermediate purlins.

RIDGING.—Provide and fix standard ridging, formed from 18" strips of 24g. Queen's Head galvanized or Zincanneal flat sheet. Ridging to be supplied in 6'-8' lengths, lapped at least 6" at the joints, the whole being secured to purlins in conjunction with roofing sheets.

EAVES GUTTERS.—It is preferable to provide eaves gutters to conserve a large quantity of rain water collected by the structure illustrated. These are to be 5"-6", 24g. Queen's Head galvanized sheet or Zincanneal beaded edge quadrant type, in 6'-8' lengths, fixed in position with required falls to outlets; lapped, double riveted and soldered at joints. Gutters are connected direct to galvanized sheet with gutter brackets at 3' centres, with $\frac{1}{4}$" diameter galvanized bolts and washers. Gutters are cut to receive thimble connections of downpipes and properly soldered at these junctions. Provide galvanized wire grating at downpipe outlets.

DOWNPIPES.—Provide and fix, where required, 3" diameter 24g. galvanized or Zincanneal sheet rain water pipes in 6'-8' lengths, complete with all necessary bends, elbows, and junctions. Downpipes are to be blocked out 1" clear of walls, and are to be painted prior to fixing.

SKYLIGHTS.—Provide and fix, where required, standard skylights of the fixed unventilated type. Skylight to be complete with condensation gutters, cappings and clips.

NOTE.—A galvanized iron roof will last longer if the end and side laps are painted, before fixing, with any good quality roof paint. The points of contact are where corrosion usually begins.

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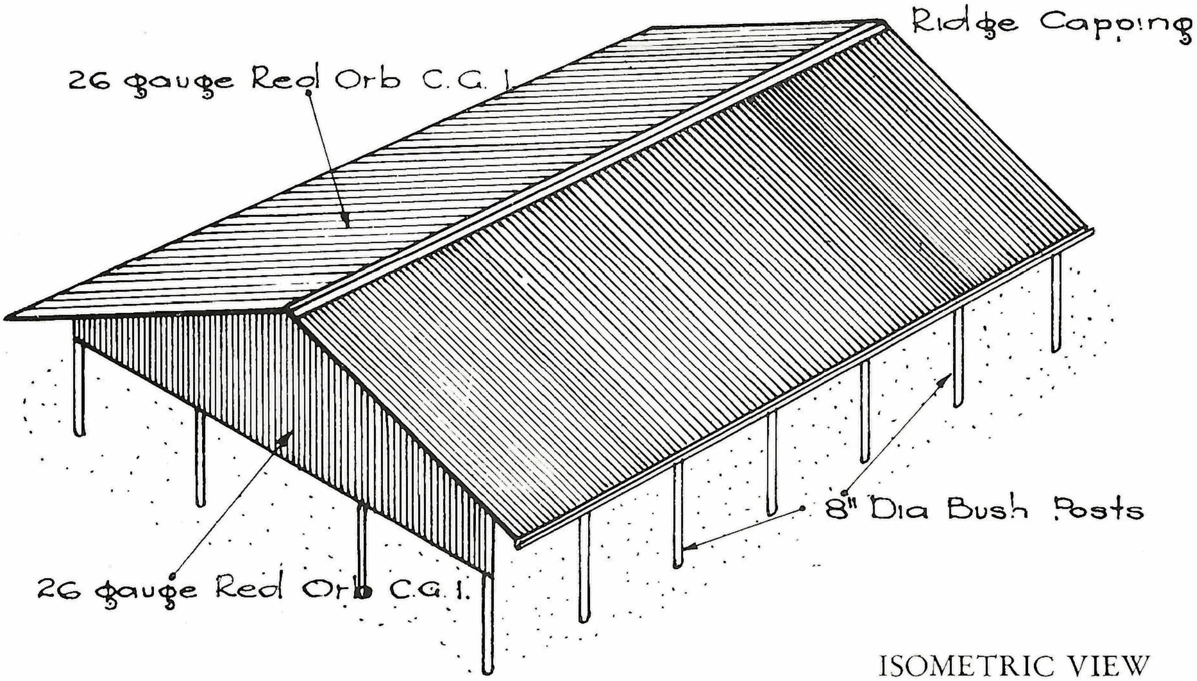
FARM BUILDINGS SECTION

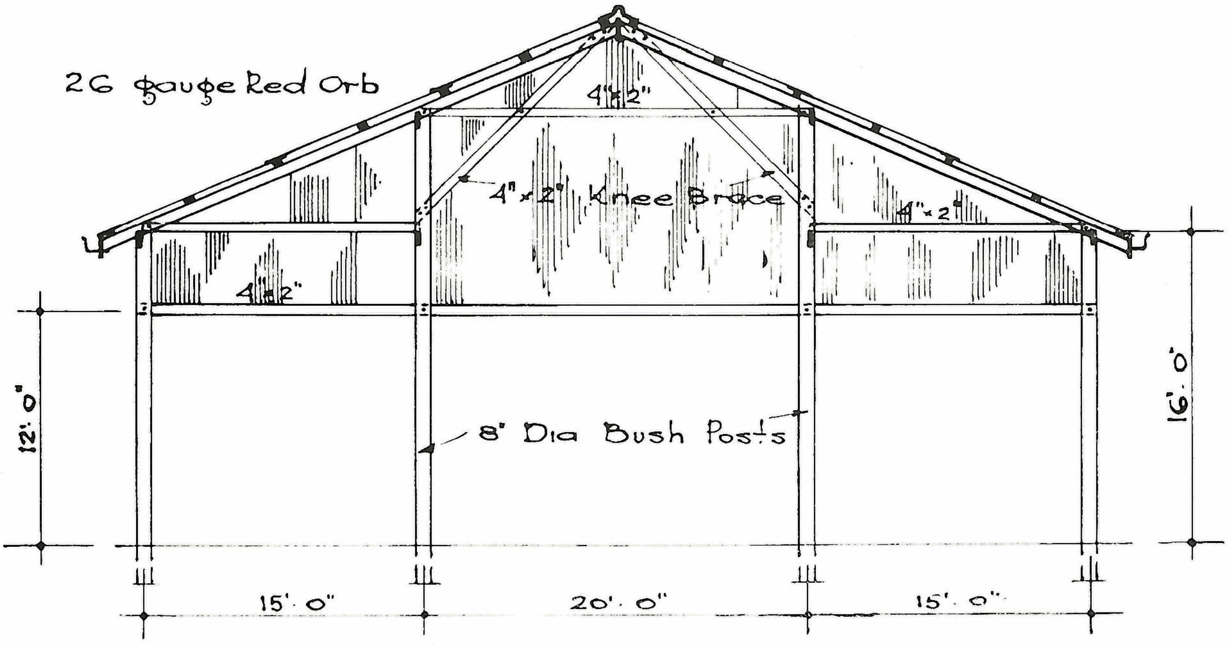
LYSAGHT'S COUNTRY SERVICE

SHEET 4153

HAY SHED



ISOMETRIC VIEW



CROSS SECTION

FARM BUILDINGS SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4153

HAY SHED

GENERAL.—The design for a hay shed, as illustrated overleaf, provides for a building of six open bays, roofed, and partly end-sheeted with Lysaght's Red Orb galvanized or Red Zincanneal corrugated sheet. The framework consists of cypress pine or hardwood framing, carried on round bush timber posts. The distance between bays is 12', and the cross section shows dimensions between interior roof supporting posts. The structure can be increased by any multiple of 12', as desired. Some owners prefer to completely sheet in each end, or, alternatively, sheet one side, depending on local wet weather conditions and prevailing winds.

FLOOR.—The floor is of earth, built up 6"-12" above the natural ground level, and well consolidated.

POSTS.—Posts are to be of bush timber, not less than 8" diameter at the small end, and set a minimum of 3' in the ground. They should preferably be potted in a concrete blob footing, 18" diameter x 3' 6" deep. The portion set in the ground and 2' above ground level is to be coated with creosote or a heavy coat of hot tar. Tops of posts are to be scarfed out to take 6" x 3" top plates and transverse ties, posts being holed for ½" bolts. Posts should be free of bark before erection.

ROOF FRAMING.—The roof is to be framed up with 4" x 2" rafters at 3' centres, fixed to 7" x 1½" ridge, and bird's-mouthed over 6" x 3" plates, halved into vertical posts and secured with 16g. strapping.

Provide and fix 3" x 1¼" battens.

Provide and fix 4" x 2" knee braces and ties, as shown on cross section, bolted with two ½" bolts to each upright.

Between interior columns, in end bays only, provide 4" x 2" diagonal bracing of columns, braced longitudinally between roof plate and tie level.

END FRAMING.—The gable ends are sheeted from the apex to some 12' above ground level. The ends are framed up with 4" x 2" girts, bolted to uprights at a distance apart not exceeding 4'.

ROOF SHEETING.—The roof is to be sheeted with 10' lengths of 26g. Lysaght's 10 x 3" corrugations Red Orb or Red Zincanneal sheet, applied with a side lap of 1½ corrugations and a minimum end lap of 6". Sheets are fixed with spring-headed roofing nails through the top of every second corrugation at end laps and every third corrugation at intermediate points.

END SHEETING.—The ends are to be sheeted with 10' lengths of 26g. 10 x 3" corrugations Red Orb or Red Zincanneal sheet.

RIDGE CAPPING.—The ridge capping should be of standard type, formed from 18" wide strips of Queen's Head or Zincanneal flat sheet, applied in 6'-8' lengths, lapped at least 6" at the joints, and fastened to the battens in conjunction with the roofing sheets.

EAVES GUTTERS.—It is considered that advantage should be taken of the large coverage of the shed to provide a catchment for the collection and storage of rain water. Provide eaves gutters of 5", 24g. Queen's Head galvanized iron or Zincanneal sheet, beaded edge quadrant type. Guttering should be formed in 6'-8' lengths, fixed in position with required falls to one end of the shed, lapped, double riveted and soldered at joints. Guttering is secured to end of rafters with 16g. galvanized brackets. Gutters are cut to receive thimble connections of downpipes, and are properly soldered.

DOWNPIPE.—Provide 24g. 4" diameter Queen's Head galvanized sheet downpipe, with the necessary bends and joints to carry water from both sides of the shed to a large corrugated iron storage tank.

LIST OF QUANTITIES

TIMBER:

Size	Purpose	Length	Number	Total Quantity
8" dia.	Posts	26'	14	370 lin. ft.
		20'	14	280 " "
6" x 3"	Plates	14'	24	340 " "
4" x 2"	Rafters	18'	50	2100 " "
		12'	48	
	Knee Brace ..	12'	14	
	Tie	16'	14	
	Collar Tie ..	21'	7	
	Toe Braces ..	3'	26	
4" x 2"	Diagonal Bracing End Bays	16'	8	150 " "
3" x 1½"	Diagonal Brace	150 lin. ft.		1250 " "
	Battens	13'	84	

GALVANIZED SHEET:

Purpose	Type	Size	Length	Number
Roof ..	Red Orb	10x3" corrs. 26g.	10'	186
Siding ..	Red Orb	10x3" corrs. 26g.	10'	40
Ridging ..	Queen's Hd.	18" wide, 24g.	8'	10
Guttering .	Queen's Hd.	5" quad. 24g.	8'	20
Downpiping	Queen's Hd.	4" dia. 24g.	8'	8

MISCELLANEOUS:

½" dia. bolts, nails, spring-headed nails, gutter brackets, etc., as required.

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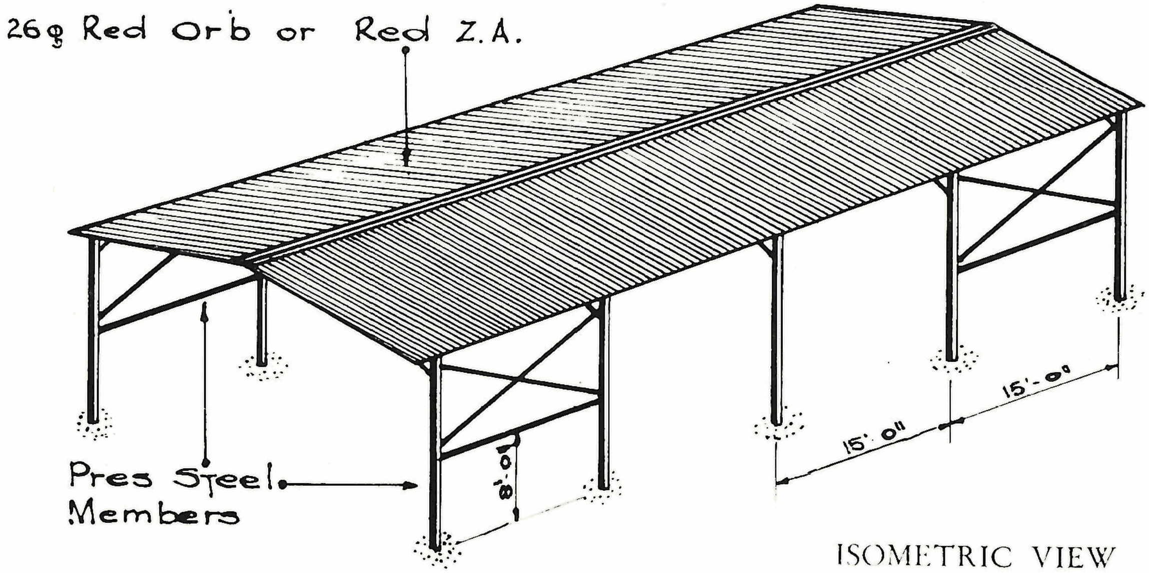
FARM BUILDINGS SECTION

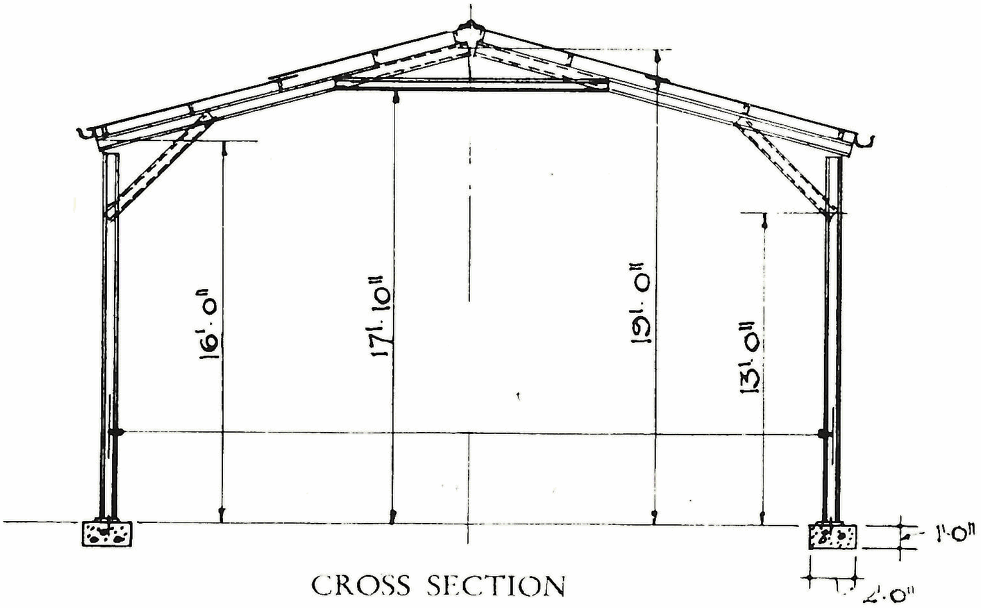
LYSAGHT'S COUNTRY SERVICE

SHEET 4156

ARMCO "PRES-STEEL" PREFABRICATED HAY SHED



ISOMETRIC VIEW



CROSS SECTION

JOHN LYSAGHT (AUST.) PTY. LTD.

FARM BUILDINGS SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4156

ARMCO "PRES-STEEL" PREFABRICATED HAY SHED

GENERAL.—The present tendency in farm shed construction is towards the use of all-steel prefabricated buildings. To meet the demand for an all-steel hay shed, Armco have produced a 30' span, 60' long prefabricated structure, shown overleaf. It is essentially a steel frame, carrying a roof of galvanized corrugated iron. The limiting dimensions are:—

30' centres of columns across the building, and 15' centres of frames along the building (length of the building required may be supplied in multiples of 15'). The height to eaves is 16', and the clear height at the centre is 18'. All parts are clearly marked and ready for immediate assembly, once the concrete footings have been prepared. The preparation of the footings and the assembly of the steelwork can be readily followed from the drawings provided with each building.

FOOTINGS.—A 2' x 2' x 1' deep concrete pad is required under each of the column bases. The earth is excavated out to the required depth and concrete of 5:3:1 mix is poured and properly tamped to minimum dimensions, and allowed to stand for three days. It will be necessary, while pouring, to set 10" x $\frac{3}{4}$" diameter holding-down bolts for anchoring the steel columns, the exact location of such being obtained from the foundation drawings. The footings should be levelled evenly, and the bolts located exactly, to ensure easy assembly of the steelwork.

FRAMEWORK.—The main frames are spaced at 15' centres, and are assembled from prefabricated parts, which are manufactured to the following dimensions:—

Columns, two $4\frac{1}{2}$" x $1\frac{3}{4}$" x 3/16" Pres-Steel channels, welded back to back.
Rafters, $4\frac{1}{2}$" x $1\frac{3}{4}$" x 3/16" Pres-Steel channels.
Apex Tie, $4\frac{1}{2}$" x $1\frac{3}{4}$" x 3/16" Pres-Steel channel.
Knee Brace, $3\frac{1}{4}$" x $1\frac{5}{8}$" x 5/32" Pres-Steel channel.
Apex Gusset, 3/16" flanged plate.
Knee Gusset, 3/16" flanged plate.

CONNECTIONS.—The connection of the framework members is made with the Armco patent self-centreing dimple joints, with $\frac{1}{2}$" diameter bolts and spring washers. A recess is pressed, during fabrication, into the gusset plates and the steel members, the connection then being made by matching plate and member recesses and joining with the standard dimple washers, nuts, etc.

PURLINS.—The roof sheeting is carried on purlins of 4" x $1\frac{3}{4}$" x 5/32" Pres-Steel angles, field bolted to the frames by means of a field-bolted angle cleat, with $\frac{5}{8}$" diameter bolts.

BRACING.—End bays of the complete structure are braced diagonally in the plane of the roof and on the sides. Bracing at the sides includes a horizontal tie, commencing 8' above the ground level line. Sizes of bracing are as follows:—

Diagonal bracing, 2" x $\frac{1}{4}$" flats.
Ties, 4" x $1\frac{3}{4}$" x 3/16" Pres-Steel channels.

ROOF SHEETING.—The roof is sheeted with 8' and 9' lengths of Lysaght's 26g. Red Orb or Red Zincanneal 10 x 3" corrugations sheet. Sheets are applied with a side lap of $1\frac{1}{2}$ corrugations and a minimum end lap of 9", and are secured to the purlins with $\frac{1}{4}$" diameter galvanized hook bolts, through the top of every third corrugation at the end of sheets, and three to each sheet at intermediate purlins.

RIDGE CAPPING.—Provide 24g. Queen's Head galvanized iron or Zincanneal standard ridge capping, in lengths of 6' or 8'. These are lapped 6" and securely fixed in position, in conjunction with the roof sheeting, to the purlins, with 3/16" diameter galvanized hook bolts and washers.

EAVES GUTTERS.—Many owners will desire to conserve the large quantity of water collected by the structure illustrated. Eaves gutters may be attached to the building, if required, by first assembling an Armco fascia unit to the framework. Guttering shall be of 5" 24g. Queen's Head galvanized iron or Zincanneal beaded edge quadrant type, in 6'-8' lengths, fixed in position to required falls to outlets, lapped, double riveted and soldered at joints. Guttering is secured with 16g. galvanized gutter brackets, bolted to fascia plate with $\frac{1}{4}$" diameter galvanized bolts, in 2" x 5/16" slots, which allow for the necessary fall. Cut gutters to receive thimble connections of downpipes, and properly solder at these junctions. Provide galvanized wire gratings at all downpipe outlets. Properly construct all stop ends, mitres, etc.

DOWNPIPES.—Provide and fix at ends, when required, 24g. 3" diameter round galvanized iron or Zincanneal rain water pipes, in 6'-8' lengths, well entered and soldered at joints, and complete with all necessary bends, elbows, junctions, etc. Downpipes shall be secured with 16g. straps, bolted to columns with two 3/16" galvanized bolts and washers, spacing of same to be two to each length of pipe. Downpipes should be painted prior to fixing. Arrange for pipes to discharge into tank storage or rubble dispersal drains, as required.

PAINTING.—All steelwork receives one coat of shop paint before delivery, and should be painted, after assembly, with one coat of light grey or aluminium paint. A galvanized iron roof will last longer if the end and side laps of the sheets are painted, before fixing, with any good quality roofing paint. These points of contact are where corrosion usually begins.

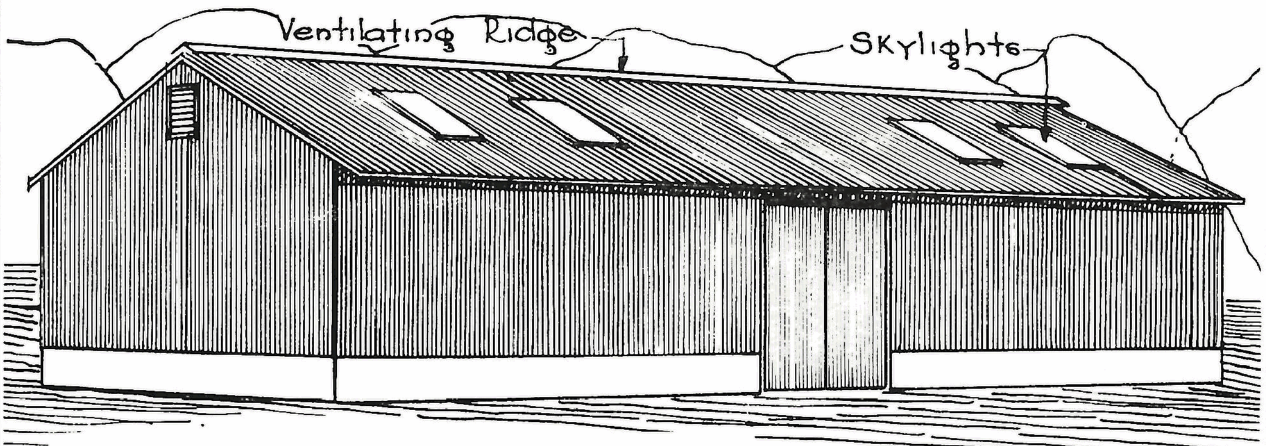
LYSAGHT
ORB
AUSTRALIA

FARM BUILDINGS SECTION

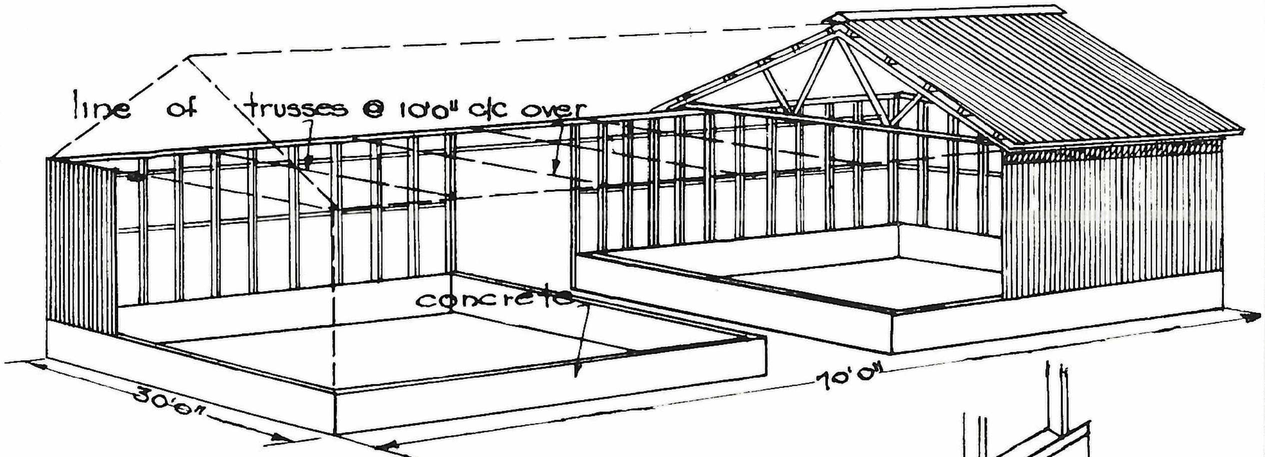
LYSAGHT'S
COUNTRY SERVICE

SHEET 4162

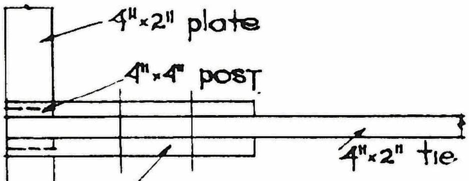
GRAIN SHED



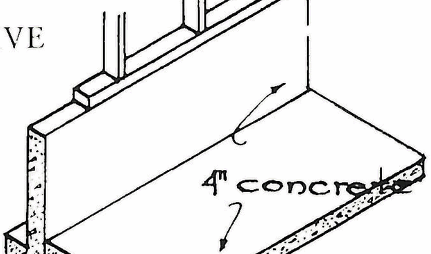
PERSPECTIVE VIEW



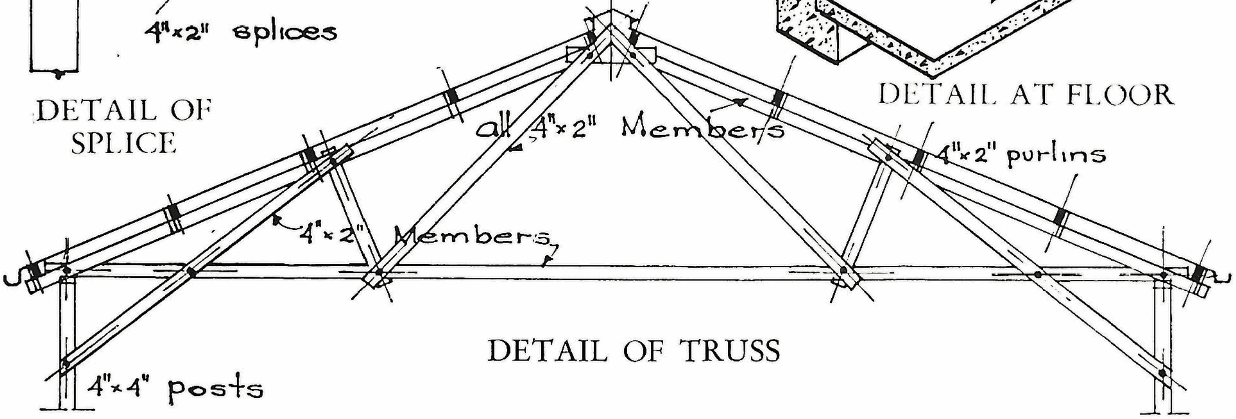
SECTIONAL PERSPECTIVE



DETAIL OF SPLICE



DETAIL AT FLOOR



DETAIL OF TRUSS

FARM BUILDINGS
SECTION

LYSAGHT'S
COUNTRY SERVICE

SHEET 4162

GRAIN SHED

GENERAL.—The 70' x 30' grain shed, as indicated overleaf, is a suggested economical design for the farmer who requires to store large quantities of bagged grain in a vermin-proof structure. It is so designed that a vehicle may drive through the centre of this building and unload under cover direct into storage space on either side of the passageway. It will be apparent from the sketch that this building provides vermin-proof storage with adequate ventilation and light. The provision of skylights in the roof is more satisfactory than the inclusion of windows on the side walls, as bagged grain can then be stacked as high as the eaves without any danger of breakage of glazed windows. With ventilating ridge and ventilated eaves the temperature inside the building will be suitable for all species of grain.

FLOOR AND DWARF WALLS.—The floor and walls of the grain shed are to be of concrete 4" thick, of 5:3:1 mix, cement rendered and graded 1" in 12' to sumps provided, one to each compartment. These sumps are normally covered with cast iron, steel, or wooden plates, that can be removed for draining or washing out the sheds. All wall framing is to be placed on concrete dwarf walls 4" thick and 2' 6" above floor level. Bottom plates are bolted to this dwarf wall by ½" diameter roof bolts, set in concrete a minimum depth of 3".

REINFORCEMENT.—All dwarf walls used in the construction should preferably be reinforced at the intersection of the floor and wall by means of short lengths of reinforcement rod or ½" wire netting, embedded in the concrete. The wire netting must extend not less than 12" on each side of the angle made by the floor with the walls.

WALL FRAMING.—The walls are framed up with 4" x 4" posts at 10' centres for support of trusses, 4" x 2" studs at 24" centres, 4" x 2" top and bottom plates, and nogging pieces to provide the fixing for vertical corrugated iron sheeting, as shown. A 4" x 2" nogging piece should be fixed 12" below top plate level to provide the frame for a ventilating panel. The space between this nogging piece and top plate is filled with bird wire of ½" mesh. Provide end gable framing with verticals and noggings of 4" x 2" timber.

ROOF FRAMING.—Roof trusses, as illustrated, are to be framed up in 4" x 2" hardwood timbers throughout. Each joint in the truss is to be secured with two ⅝" diameter bolts with square washers. Provide five equally spaced 4" x 2" purlins to each principal rafter, supported by timber cleats or 1" 16g. galvanized strapping taken down and around the principal rafter of the truss. The principal rafters are to be bird's-mouthed over the top plate and additionally secured with galvanized strapping.

WALL SHEETING.—The walls should be covered with 9' sheets of 26g. Lysaght's 10 x 3" corrugations Red Orb or Red Zincanneal sheet, applied with a side lap of one corrugation. If it is desired to increase the height of the shed, sheets are available of lengths up to 12', but an endeavour has been made here to use 9' sheets throughout. Noggings are provided at mid points of the vertical studs, and the sheets are secured with spring-headed roofing nails or galvanized screws and washers through the top of every second corrugation at the end of sheets and three to each sheet at the intermediate fixings.

ROOF.—The roof is covered with 9' sheets of Lysaght's 10 x 3" corrugations 26g. Red Orb corrugated galvanized iron or Red Zincanneal sheet, applied with a side lap of 1½ corrugations and a minimum end lap of 6". Sheets are fixed with spring-headed roofing nails or galvanized screws and washers through the top of every second corrugation at ends of sheets, and through the top of every third corrugation at intermediate battens.

VENTILATING RIDGE.—Provide and fix ventilating ridge of the type selected in 6' or 8' lengths, lapped at least 6" at the joints, secured to 1", 12g. galvanized steel brackets, spaced at 3' centres, and fixed to purlins with galvanized screws and lead washers (or spring-headed roofing nails). Provide and fix in conjunction with the top sheet of the roof 24g. galvanized iron or Zincanneal flashing pressed down into the corrugations. Bird-proof with ½" mesh the entire length of the ventilating ridge. Bird wire may be fixed to 2" x 1" battens, spot-soldered to ridge capping, and fixed under flashing to the roofing sheets.

EAVES GUTTERS.—Eaves gutters shall be 5", 24g. Queen's Head galvanized iron or Zincanneal beaded edge quadrant gutters, in 6'-8' lengths, fixed in position with required falls to outlets. These are lapped, double riveted and soldered at joints, and secured to fascia board with 16g. galvanized brackets, screwed with a pair of screws at intervals of approximately 3'. Alternatively, the fascia board can be dispensed with and 16g. brackets fastened direct to sheets at intervals of 3' with 3/16" galvanized bolts, nuts and washers, each point of fixing. Gutters are cut to receive thimble connection of downpipes, and are properly soldered at these junctions. Provide galvanized wire grating at downpipe outlets. Properly construct all stop ends, mitres, etc.

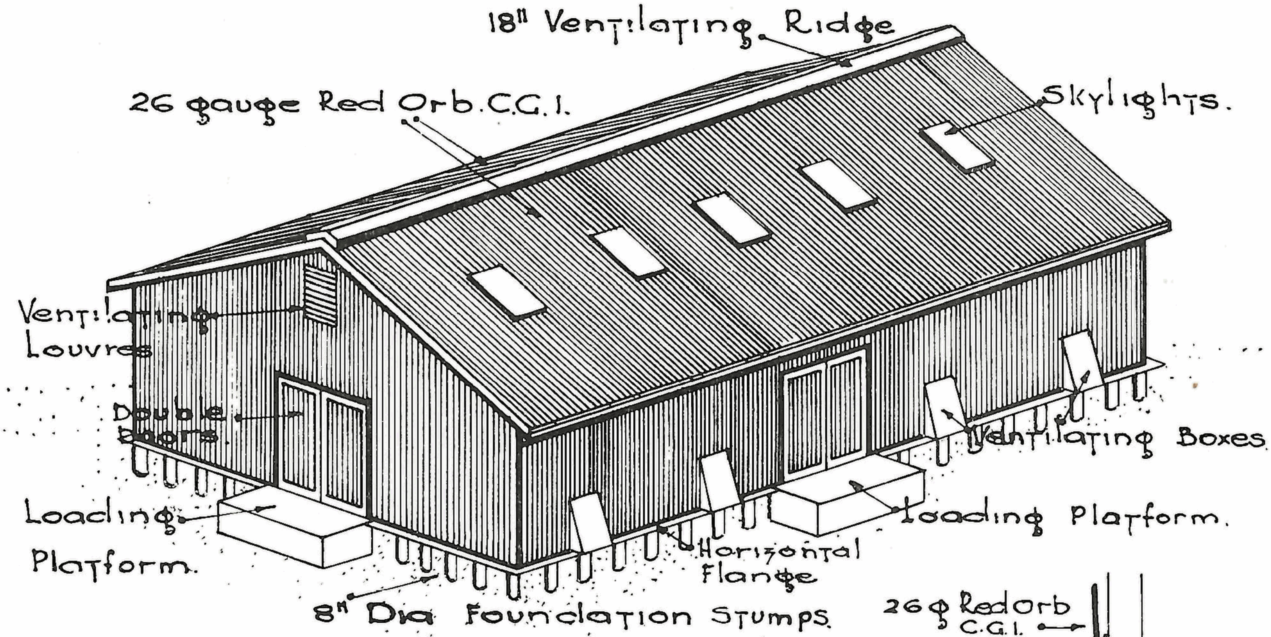
DOWNPIPES.—Provide and fix at ends, 24g. 3" diameter round Queen's Head galvanized iron or Zincanneal rain water pipes in 6'-8' lengths, well entered and soldered at joints, and complete with all necessary bends, elbows, junctions, etc. Downpipes shall be secured with 16g. straps bolted to wall sheets with 2 3/16" diameter bolts, spacing of same to be two to each length of pipe. Downpipes shall be connected at the head to thimble connections with crimped bends, straight elbows, or swan-neck bends, and arranged to discharge into tank storage. Pipes should be painted prior to fixing.

SKYLIGHTS.—Provide and install, where shown, eight skylights of size as required, a recommended size being 4' x 18". Skylights are to be constructed of 24g. galvanized iron sheet or Zincanneal, and are to be of the fixed unventilating type. These are to be complete with condensation gutters, capping, and clips, and glazed with ¼" wired plate glass.

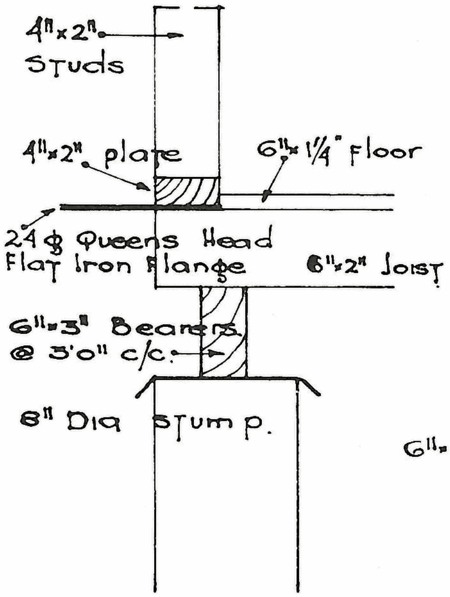
DOORS.—Provide and fix on each side two 10' x 4' doors, as shown, hung from three heavy 12" hinges, and to swing through 180°. Doors are to be framed with 6" x 2" hardwood stiles and ledgers, braced with 4" x 2" hardwood braces top and bottom. Doors to be sheeted externally with 10' lengths of 8 x 3" corrugations 26g. Red Orb corrugated iron or Red Zincanneal sheet.

PAINTING.—A galvanized iron roof will last longer if the end and side laps of the sheet are painted before fixing with any good quality roof paint. Points of contact are where corrosion usually begins unless they are suitably painted.

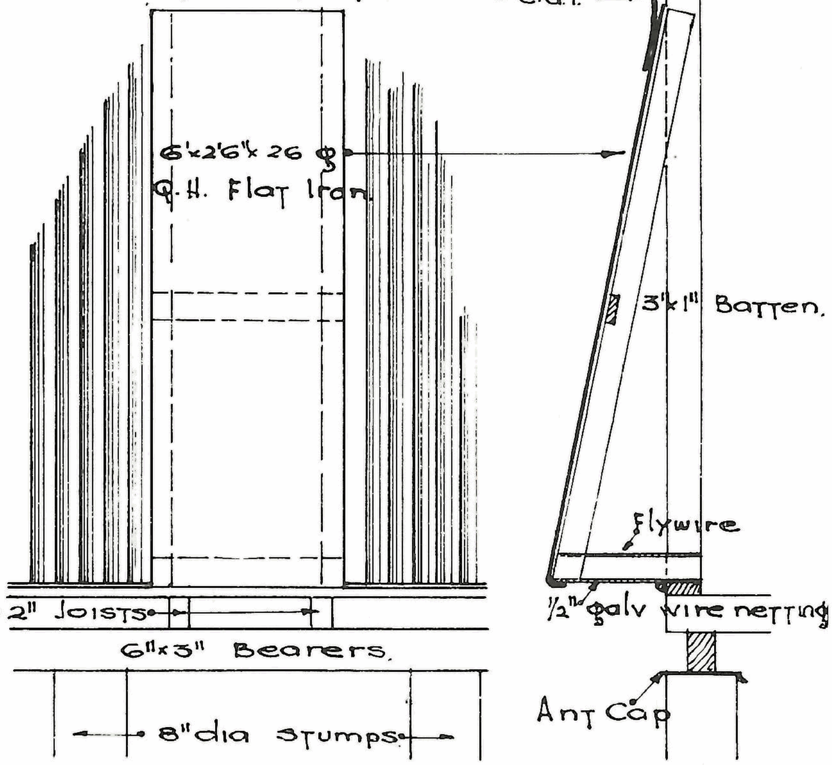
ELEVATED GRAIN SHED



ISOMETRIC VIEW



DETAIL OF FLOOR



DETAIL OF VENTILATING BOXES

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FARM BUILDINGS SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4163

ELEVATED GRAIN SHED

GENERAL.—Many farmers prefer their grain shed elevated on piers. This sheet portrays, in the isometric sketch overleaf, a vermin-proof shed, 50' x 30', which allows for passageways and provides storage for approximately 2,500 bags or 200 tons of bagged wheat.

The shed is designed with one platform and double swing doors to each exterior wall, thus enabling the various varieties of bagged grain to be handled with ease. Ventilation is provided by means of a ventilating ridge running the full length of the roof, and eight special type ventilating boxes in the longitudinal wall, as shown. The building is vermin-proof by virtue of the fact that it is raised 2' 9" above ground level, completely sheeted with corrugated galvanized iron, galvanized iron caps over all pier stumps, and a 6" horizontal strip of galvanized flat sheet carried out at floor level for the whole perimeter of the building. Similarly, the loading platform sides are sheeted with 24g. Queen's Head flat sheet.

FOUNDATION STUMPS.—Stumps are to be of round bush timber of not less than 8" diameter, spaced not to exceed 3'-3' 6" intervals across the building, and not more than 5' centres longitudinally. In normal ground it will be necessary to provide 12" x 12" x 2" hardwood sole plates under the posts, to withstand the heavy loadings placed on them. Alternatively, it is preferable to pot each post in a concrete block footing 18" x 18" x 30". The whole of the stumps should be free from bark and coated with creosote before erection.

ANT CAPS.—Fix under the bearer to each post 12" x 12" x 26g. galvanized iron ant caps, turned down 45° at each side.

POSTS.—Internal to the building, foundation stumps are carried through the floor to support plates to carry roof scantling timbers. These posts are spaced 10' apart each way.

FLOOR.—The floor is to be of 4"-6" x 1¼" hardwood laid on 6" x 2" joists spaced at not more than 18" centres, 6" x 3" bearers at 3' centres. Each floor board is to be nailed to joists by 2-2½" nails at each bearing.

WALL FRAMING.—The wall framing is designed for the economical use of 10' lengths of Lysaght's 26g. Red Orb. Walls are framed up with 4" x 2" studs at 2' centres. Door posts and corner studs are to be 4" v 4". 3" x 2" horizontal nogging pieces are to be let in between the 4" x 2" hardwood studs, spacing not to exceed 3' 6" centres vertically. Each 10' panel is to be braced diagonally with 3" x 1" timbers halved into studs.

ROOF FRAMING.—The roof is to be framed up in 4" x 2" rafters at 2' centres. Rafters are bird's-mouthed over the top plate and halved into 6" x 3" plates carried on the posts of the building. Rafters on opposite sides of the building are bolted together at the apex. Where rafters are bird's-mouthed over plates, they are to be secured with 16g. galvanized strapping. Roofing is to be fixed to 3" x 1¼" battens.

DOORS.—Twin 7' x 4' framed, ledged and braced doors are to be provided at each side of the building of the loading platform. These doors are to be sheeted with two 7' lengths 8 x 3" corrugations 26g. Red Orb sheet, hung with three hinges to each door. The doors are to swing through 180°. The meeting style of one door in each pair is to have 1½" x 1½" x ⅛" angle screwed to the style to ensure that the doors are vermin-proof when closed. Stops should be provided for each door, and 8" tower bolts provided at the top and bottom.

LOADING PLATFORMS.—Loading platforms are to be framed up in similar construction to that of the floor, dimensions 8' long x 4' wide x 2' 9" high, six stumps per platform with 6" x 3" bearers, 4" x 2" joists, and 1¼" decking. The whole of the sides of the platform are to be sheeted with 6' x 36" x 24g. Queen's Head flat iron, sunk 3" into the ground. A 6" x 2" hardwood buffer should be fixed to the top edge of the platform all round, to withstand bumping by trucks, etc.

HORIZONTAL FLANGE.—A horizontal flange is to be formed from Lysaght's 6' x 36" x 24g. Queen's Head flat sheet, cut into 4-9" strips, fixed to underside of bottom plate and projecting 6". Vertical wall sheeting is to butt down tightly on this flange.

VENTILATING BOXES.—Eight ventilating boxes are to be constructed on the longitudinal walls as shown in detail. Each occupies the width of one standard 10 x 3" corrugation sheet. These are to be framed up with 3" x 2" scantlings spiked to studs and covered on the outside with one sheet of 6' x 30" x 26g. Queen's Head flat galvanized iron or Zincanneal. The sides of the box are similarly sheeted with pieces cut from 6' x 36" x 26g. Queen's Head galvanized iron provided with the necessary turned back flashing edge to fit beneath the corrugations of the vertical sheets adjoining the ventilating box. The ventilating aperture at the bottom is to be covered entirely with ½" galvanized wire netting, and to ensure complete vermin-proofing, a second layer of rust-proof fly wire is to be fixed, as shown in the detail.

WALL SHEETING.—The walls are to be sheeted with 10' lengths of Lysaght's 26g. 10 x 3" corrugations Red Orb galvanized iron, applied with a side lap of one corrugation. Sheets span from bottom to top plate, and are secured to two intermediate nogging pieces, let into studs, with spring-headed roofing nails or galvanized screws and washers, through the top of every second corrugation at the top and bottom of the sheet, and three nails to each intermediate fixing.

ROOF SHEETING.—The roof is to be covered with 9' lengths of Lysaght's 26g. 10 x 3" corrugations Red Orb galvanized sheet, applied with a side lap of 1½ corrugations and a minimum end lap of 6". Sheets are fixed to battens with spring-headed roofing nails or galvanized screws and washers, through the top of every second corrugation at end points and through the top of every fourth corrugation at intermediate battens.

SKYLIGHTS.—Provide and install, where shown (on southern side of building), five skylights, to conform to 9' sheets of iron. These are to be of the fixed unventilating type, complete with condensation gutters, cappings and clips, and glazed with ¼" wired plate glass.

RIDGING.—The ridge capping should be of the ventilating type, formed from 6'-8' lengths of 18" wide strip. Bend strips to form the ridge capping, lap 6" at the joints, double rivet, and secure to rough battens with the necessary brackets. Provide bird-proof wire and 9" flashings.

EAVES GUTTERS.—Eaves gutters shall be 5"-24g. Queen's Head galvanized iron or Zincanneal beaded edge quadrant type in 6'-8' lengths, fixed in position with required falls to end desired. These are lapped, double riveted and soldered at joints, and secured to rafters with 16g. galvanized brackets. Gutters are cut to receive thimble connections of downpipes, and are properly soldered at these junctions. Provide galvanized wire grating at downpipe outlets.

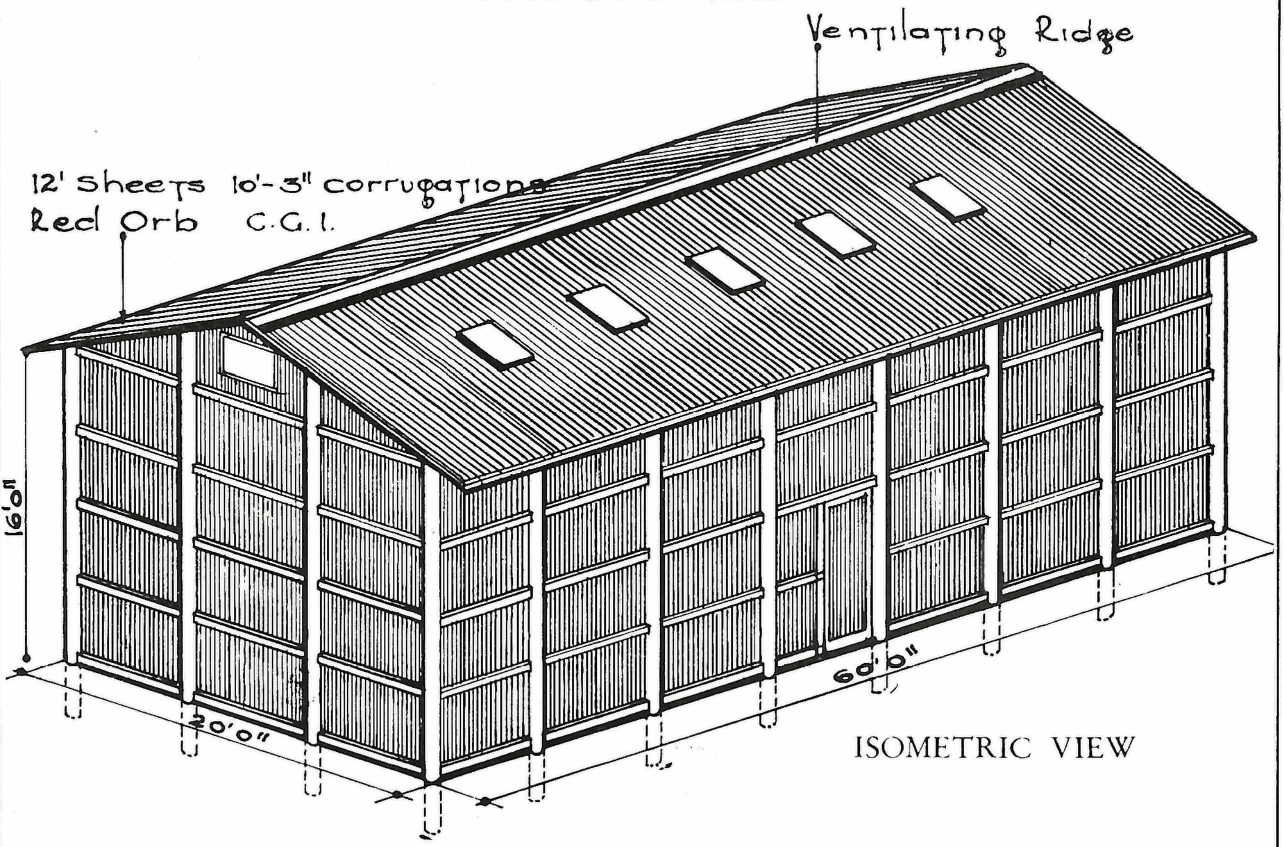
DOWNPIPES.—Provide and fix where required 24g. 3" diameter round galvanized iron or Zincanneal rain-water pipes in 6'-8' lengths. Provide special vermin-proof vessel on downpipe to prevent entry of rats and mice via downpiping.

FARM BUILDINGS SECTION

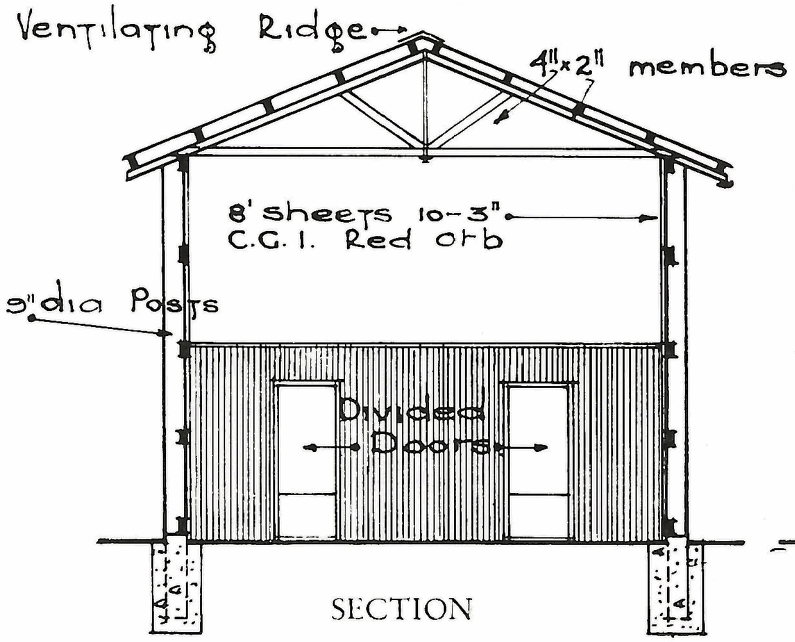
LYSAGHT'S
COUNTRY SERVICE

SHEET 4172

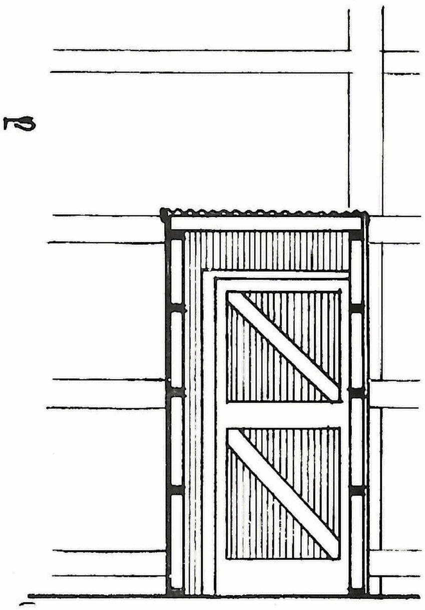
BULK CHAFF SHED



ISOMETRIC VIEW



SECTION



SECTION OF ALLEYWAY

FARM BUILDINGS
SECTION

LYSAGHT'S
COUNTRY SERVICE

SHEET 4172

BULK CHAFF SHED

GENERAL.—This outline specification refers to the isometric sketch and details shown overleaf. Bulk chaff sheds have been used to great advantage in the southern area of New South Wales, and their use can be extended to other areas where it is desired to store bulk chaff for bagging when required. A convenient size has a capacity of approximately 50 tons, computed on the basis that one ton of chaff requires 400 cubic feet of storage.

It is intended that this bulk chaff shed may be filled through openings in the gable spandril at each end, using a chaff blower.

The doors provided at the centre of each long side of the building provide an entrance to a central alleyway. This central alleyway, together with an associated partition, divides the shed into two compartments. On either side of the central alleyway are two doors, each of which may be opened in two sections, to enable the withdrawing of chaff in quantity, dependent on the level of the chaff in the shed when bagging.

POSTS.—Posts are to be of bush timber, and not less than 8" diameter at the small end. These are spaced at approximately 8' centres, and set a minimum of 3' into the ground. They should preferably be potted in a concrete blob footing 18" diameter x 3' 6" deep. The portion set in the ground and 2' above ground level is to be coated with creosote. Posts are to be halved, as illustrated, to carry girts and top plates.

WALL FRAMING.—The wall framing is designed for the economical use of Lysaght's 26g. Red Orb in two lengths of 8'. The walls are to be 15' 6" high, measured from ground level to the underside of the top plate, and to be framed up in 6" x 3" hardwood horizontal girts, housed 2" into the vertical bush timber poles. These horizontal girts are to be fixed on the inside of the vertical posts and either bolted with $\frac{3}{8}$" diameter cup-headed timber bolts and washers, or securely spiked with two 5" spikes at each housing.

FLOOR.—Floors have been constructed of timber, concrete and natural ground, but popular opinion is that timber is unsatisfactory and that concrete tends to bring about the sweating of the cut chaff. Consequently, it is advisable that the floor should consist of well-consolidated clay laid over well-packed hard fill. It is preferable that this clay be contained in a 6" high dwarf concrete wall poured between the posts in conjunction with concrete blob footings. This dwarf wall should also be carried under the mid-partition of the shed.

ROOF FRAMING.—The roof is carried on a series of roof trusses fixed to the vertical posts. These are framed up in 4" x 2" hardwood scantlings, each joint in the truss to be secured with $\frac{5}{8}$" diameter bolts with square washers. Provide centre tie of $\frac{7}{8}$" diameter round rod or twin 4" x 2" timbers. For ease of erection, these trusses should be fabricated on the ground in their entirety, before assembly. Purlins are to be 4" x 2", spaced at a maximum of 4' centres, and supported by timber cleats or 1" galvanized strapping, taken down and around the top cord of the trusses. The roof trusses should be bolted to the top plate (the highest girt), and the top chord of the truss halved into the top of the vertical posts, and bolted with $\frac{5}{8}$" diameter bolts with square washers. The bottom chord of the truss serves as a tie beam, with the vertical posts for retention of the chaff content.

BAGGING ALLEY.—The filling alley is to be framed up with 4" x 4" vertical studs at approximately 3' 3" centres. Top plates are to be 4" x 3", horizontal noggings to be 4" x 2". The whole is sheeted with the necessary iron, to prevent the chaff entering the alleyway.

WALL SHEETING.—The walls are sheeted with 8' lengths of Lysaght's 10 x 3" corrugations 26g. Red Orb or Red Zincanneal sheet, applied with a side lap of one corrugation and a minimum end lap of 4". Sheets span two girts spacing, and are secured with spring-headed roofing nails or galvanized screws and washers, through the top of every second corrugation at end laps and three to each sheet at intermediate battens.

ROOF SHEETING.—The roof is to be covered with 12' sheets of 26g. Lysaght's 10 x 3" corrugations Red Orb or Red Zincanneal sheet, applied with a side lap of $1\frac{1}{2}$ corrugations and a minimum end lap of 6". Sheets are fixed with spring-headed roofing nails or galvanized screws and washers, through the top of every second corrugation at end points and through the top of every third corrugation at intermediate battens.

DIVISION WALL AND BAGGING ALLEY.—The division wall and alleyway are sheeted with 8' sheets of 10 x 3" corrugations Red Orb or Red Zincanneal sheet, laid vertically. 7' sheets of 10 x 3" corrugations galvanized sheet are laid longitudinally across the top of the alleyway, lapped 4" and nailed to cross pieces at 3' 3" centres.

EAVES GUTTERS.—It is considered that advantage should be taken of the coverage of this shed to provide a catchment for the collection and storage of rain water. Eaves gutters of 4" 24g. "Queen's Head" galvanized iron or Zincanneal beaded edge quadrant gutters should be provided, in 6' or 8' lengths, fixed in position with required falls to one end of the shed. These are lapped, double riveted and soldered at joints, and secured to fascia board with 16g. galvanized brackets at end of trusses and mid joints between trusses.

DOWNPIPE.—Provide 24g. 3" diameter "Queen's Head" galvanized sheet or Zincanneal downpipe, with the necessary bends and joints to carry water from both sides of the shed to a 3,000-gallon corrugated iron storage tank.

DOORS.—Doors are provided in the long sides of the shed at mid points. These are 7' x 3', framed, ledged and braced doors, sheeted with 8-3" corrugations sheets, cut to required width, and hung with 3-9" heavy "T" hinges. From the alleyway to each half shed are provided two openings, each of a door opening into two sections. The overall height of the door should be 7', the bottom half having a height of 2'. Each will be framed up in 6" x 1" timbers and sheeted with lengths of 10 x 3" corrugations iron cut to the required length. Each portion of the door shall be hung with 2-9" heavy "T" hinges.

SPANDRIL OPENINGS.—Twin shutters or doors, each 3' x 2', framed up in 4" x 1" timbers of the necessary length, and 26g. Red Orb galvanized sheet cut to the required length, will be provided at the end of each building in the gable spandrils.

RIDGE CAPPING.—The ridging should be of the 18" ventilating type, applied in 6'-8' lengths, lapped at least 6" at the joint, double riveted, and secured with the necessary brackets and bird-proof wire.

SKYLIGHTS.—It may be considered that the provision of light in the storage bins might be an advantage when cleaning it, etc., and we suggest that the skylights of the fixed unventilated type be provided. Skylights are to be complete with condensation gutters, cappings, and clips.

NOTE.—Chaff is blown into the bins through openings at the gables by means of a fan blower driven off the chaff-cutter drive. A suitable link-up enables both the chaff-cutter and the blower to be operated at the same time. Chaff is bagged in the central alleyway by the use of the lower portion of the doors that are provided in two sections.

LYSAGHT'S
COUNTRY SERVICE

SHEEP SECTION

LYSAGHT
ORB
AUSTRALIA

JOHN LYSAGHT (AUST.) PTY. LTD.

FOREWORD

Recent developments in methods of construction and materials have influenced the design and dimensions of farm buildings. Timber is fast being replaced in the framework of buildings by steel, either assembled locally or erected from prefabricated units. For roofing, walling, or many rural requisites, no more economical, adaptable or universal material than galvanized steel sheet has yet been discovered. While galvanized sheeting requires simple framing, substitute materials, apart from their inherent disadvantages as a roofing material, necessitate more complicated and costly roof structures.

An efficiently planned group of buildings cannot change poor sheep land into valuable property, but well-designed buildings, properly laid out, will enable the best use to be made of land, labour, and stock. Some owners will prefer to postpone building changes or additions until labour and materials are fully available, but now is the time to plan future developments.

In making alterations to buildings and the erection of new ones, individual effort and enterprise will continue, as formerly, to assert itself in the rural community. But general farming interest will not be served unless steps are taken to make available knowledge of successful designs. With this idea in mind, John Lysaght's have instituted an advisory service to provide the necessary data to the pastoralist. Advantage can be taken of the advice offered by Lysaght's Service Department.

Data Sheets in this section, in addition to showing on one side a sketch plan, and on the other side a brief description or specification, have attempted to deal with basic principles affecting structures, and designs are executed to these principles. The Sheep Section of the Country Service Manual should be read in conjunction with its associate sections, "Farm Buildings" and "Tanks and Tankstands."

Together with Lysaght's Plan Service, this section should be of the greatest value to sheep owners, builders, and to all others interested in seeing that our farms are properly equipped. Though provided as a section in the Country Service Manual, it can be obtained, as a separate brochure, on application.

We recognise the wide variations necessary in every type of shearing shed, by reason of a diversity in size of holding, locality, and other circumstances, and have considered the practicability of ultimately preparing alternative designs and plans for each type. We shall also, at a later date, include data sheets on those simple structures for housing of shearers, in conformity with the Shearers' Act.

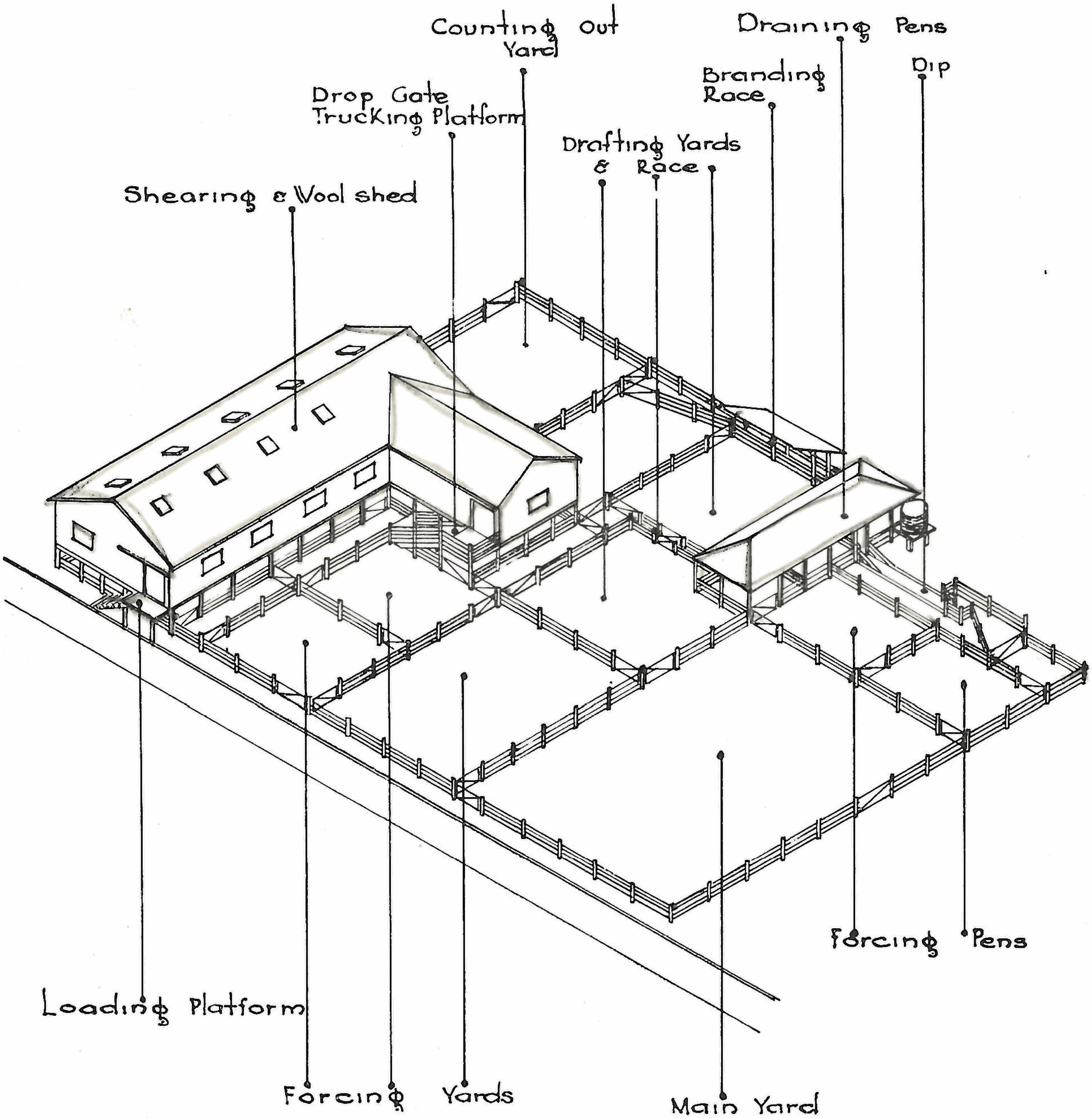
Technical information has been provided from various State sources to our planning centre, and it has been of immense value. We feel that our knowledge can be greatly augmented by continuous contributions from readers in all States. Consequently, we look forward to your suggestions as to shed designs, structures used for watering and feeding, and all manner of devices that you have found to be of assistance. What you provide now will be passed back to your fellow farmers in future editions of this section and Manual.

SHEEP SECTION

LYSAGHT'S
COUNTRY SERVICE

SHEET 4213A

GENERAL LAYOUT OF SHEEP YARDS



SHEEP SECTION

SHEET 4213A

LYSAGHT'S
COUNTRY SERVICE
GENERAL LAYOUT OF SHEEP YARDS

SHEEP YARDS

GENERAL.—A wide range of yard designs exist from which to make a choice, and the most that can be done in this data sheet is to provide a suitable working arrangement.

The layout of yards with the necessary auxiliaries of shearing shed, dip, draftng race, etc., is governed by the following operations, which must be carried out in the proposed design.

Drafting for the various operations.
Shearing.
Dipping.
Lamb Marking.
Branding and Jetting.
Trucking
Operations such as Crutching and Dagging.

SITE.—The site is largely a matter of convenience. All things being equal, it is an advantage to have a slight natural fall to assure effective drainage. If the yards are on a slope, they should be set out so that the sheep work up the hill.

FENCES.—Safe and durable fences are important; the post and rail or paling type are recommended throughout. Rails for the outer fences should be mortised into the posts, and sawn timber rails for the crushes and pens sunk flush into the sides of the posts.

SHEEP DRAFTING

GENERAL.—In the layout overleaf the various component parts are used for drafting, as described below:—

Main Yard.—Into which the sheep are brought from the paddocks.
Forcing Pens.—In which the sheep are conveniently grouped into handy lots.
Check Pen.—Being the third of three pens covered in as shelter sheds, and also used for lamb-marking.
Drafting Race.—For drafting operations.
Drafting Yards.—For holding sheep after drafting.

DRAFTING RACE.—The length of drafting races may be varied according to personal taste. A race about 20' long, 20" wide at the entrance, narrowing to 16" wide at the drafting gate is a convenient size. The sides of the race can be made of 6" x 1½" rails sunk flush with the posts, and trimmed on the inside so as not to catch the wool.

It is preferable for the race to be sheeted up on the drafter's side in order that the sheep will not see the operator. This is best done by laying sheets of corrugated galvanized iron horizontally.

The drafting gates should be light and strong, about five feet wide, fitted with handles for drafting operations and so swung as to move easily to the touch.

The floor of the race should be preferably concreted, otherwise corduroyed, or flagstoned, to prevent dust.

SHEARING

GENERAL.—Good yard layout and plenty of holding pen capacity are essential to successful shearing operations.

Though the main yard shown in the diagram can be used as a receiving or holding yard, sheep, in general, will be brought straight into the large forcing yard, then into the small forcing yards. From here they are driven to the sweating pens or shelter pens under the shed, preparatory to shearing.

In this design the ramp and landing into the shed serve a dual purpose. In addition to providing normal entry into the shed, a drop gate at the top of the ramp allows of sheep being loaded into vehicles.

PENS.—The various pens used for shearing operations are described in Sheets 4223A, 4223B, and include sweating pens, forcing pens, and catching pens. From the shearing board the sheep are discharged via chutes to counting-out pens, and thence into counting-out yards.

DIPPING

GENERAL.—Dipping can be of the "swim" dip type or spray dip type. Sheet 4233 describes a side slide swim dip, while Sheets 4235, 4236 describe two systems of spray dipping.

DRAINING PENS.—At the exit end of the dip, two draining pens are provided with a swing gate, so that each can be used in turn. While one pen is draining the other can be filled. These pens are roofed in as shown, to provide sheep with the necessary shelter to prevent scalding after dipping. Good concrete floors are provided with each pen, having a slight fall to the outside edges, with the necessary drains and sumps to allow the fluid to flow back to the dip.

LAMB MARKING

GENERAL.—One of the most important operations is the marking of lambs. The suggested layout attempts to reconcile the varying controlling conditions of:—

Comfort for the lambs, and minimum risk of infection.
Speedy reunion of lambs and ewes.
Comfort of the marking operators.

MARKING PEN.—The lamb marking pen is a continuance of the draining pen structure, and is one of three equal sized pens. A broad rail ("Marking Rail") is provided at the end for the various operations of ear-marking, castrating, and tailing. The height of the rail is important, and should be just high enough to reach to about belt level of the operator. The floor is concreted, and, if need be, can be carried out beyond the marking rail in the form of a 3'-wide apron. This allows the whole structure to be hosed down after lamb marking is complete.

Markers, castrators, and tailers stand on the outside of the rail, and have plenty of room in which to move. The catchers operate inside the pen, handing the lambs to each marker in turn.

BRANDING AND JETTING

GENERAL.—The branding race can be separate to or combined with the jetting race. As the operators have to bend with the sun on the back of their necks, it is advisable to provide simple shelter with a galvanized iron skillion structure.

RACE.—The race will normally be 20'-30' long. If, however, the race is used for jetting as well as branding, it may be desirable to provide two jetting points, i.e., the race is to be 40'-60' in length. The width of the race should be 2' 6" to 3' 0", height on the side of the operator 2' 9", while on the other side it can be 3' 0" high. Both sides, if possible, and certainly the operator's side, should be sheeted with corrugated galvanized iron. Though this is not essential to branding, it is important to protect the operator's legs from the jetting fluid.

FLOOR.—The floor of the race is of concrete, with 6" dwarf wall construction, and proper drainage to sumps. An excellent plan is to provide a grid on the floor of the race consisting of 2" x 1" battens nailed on to 3" x 2" runners. This grid is to be sunk in a concrete tray 4"-6" deep and about 9' in length per jetting point.

ROOF.—The structure over the branding or jetting point is a simple framed skillion structure, roofed with Lysaght's 26g. Red Orb or Red Zincanneal sheet.

NOTES:

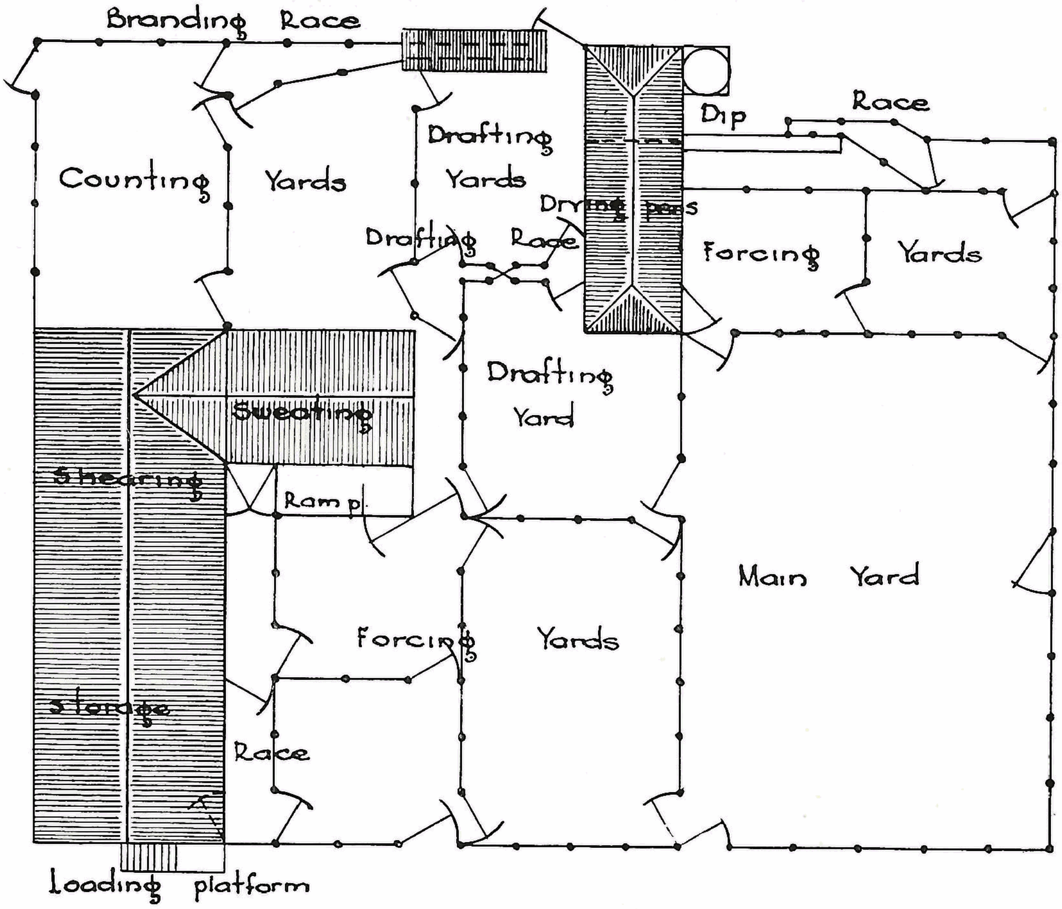
1. In many respects the yard layout is diagrammatic. For sake of clarity of line, the fences are shown as three-rail, whereas in actual fact they are almost invariably four-rails.
2. Whereas forcing pens and crushes are shown as neat square or rectangular shaped yards, most owners prefer these to have tapered sides, without corners into which sheep invariably collect.

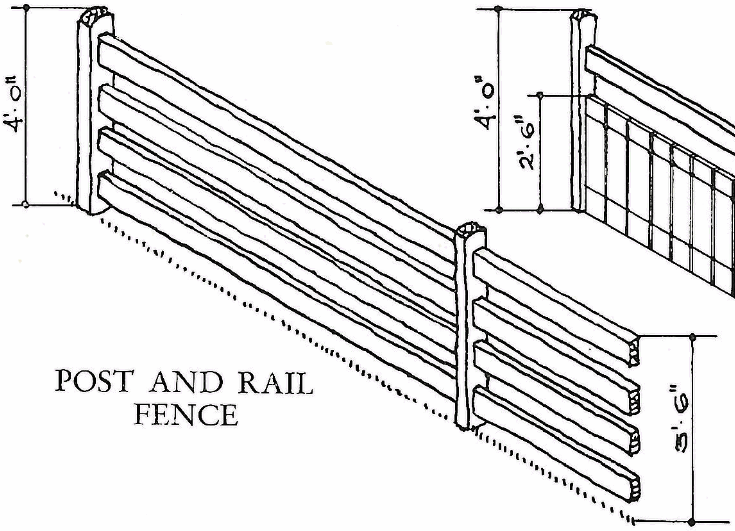
SHEEP SECTION

LYSAGHT'S COUNTRY SERVICE

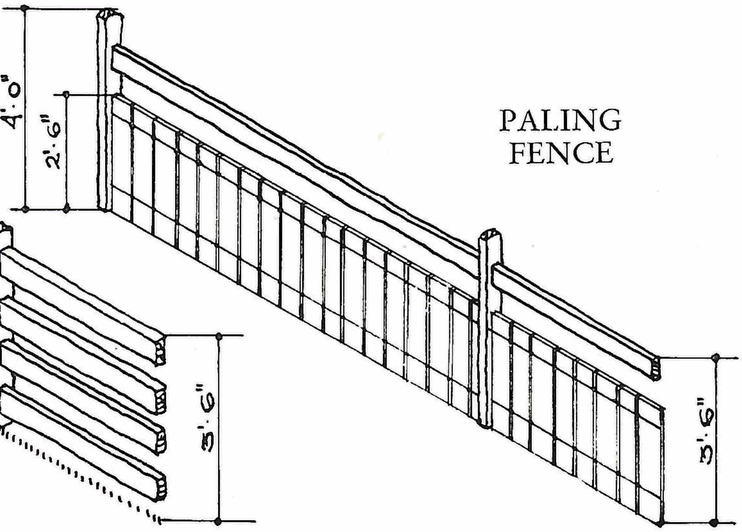
SHEET 4213B

GENERAL LAYOUT OF SHEARING SHEDS, YARDS, ETC.





POST AND RAIL FENCE



PALING FENCE

SHEEP SECTION

LYSAGHT'S
COUNTRY SERVICE

SHEET 4213B

SHEEP YARDS

LAYOUT OF SHEEP YARDS

GENERAL.—This sheet shows the plan of sheep yards illustrated in Sheet 4213B. In order to understand the layout the various operations associated with the yards are described below.

SHEEP DRAFTING.—For sheep drafting the following yards are used:—

Main Yard.—Into which the sheep are yarded from the paddocks.

Forcing Yards.

Crushing Pen.—Also used for lamb marking.

Drafting Race.

Drafting Yards.

Counting-Out Yards.—The right-hand counting-out yard can be used as a drafting yard if three-way drafting is required.

SHEARING.—For shearing the following yards are used:—

Forcing Yard (large).—Large forcing yard to the left of the main yard is used as a receiving yard.

Forcing Yard (small).—Two are provided for forcing.

Loading Race.—Can be used for loading into vehicles.

Pens of Shearing Shed.

Shelter Pens.—Beneath the wool room and shearing board.

Counting Yards.—To receive sheep from counting-out pens.

DIPPING.—The following yards and structures are used for dipping:—

Main Yard as a receiving yard.

Forcing Yards.—For convenient forward movement of sheep.

Crushing Pen.—Shown in top right hand corner of sketch —for forcing sheep into dip race.

Drying Pens.—Two are provided for this purpose, with a swing gate at the end of the dip for drafting into either.

Drafting Yards.—As holding yards before return to paddocks.

LAMB MARKING.—In lamb marking the following yards are used in sequence:—

Main Yard.—As a receiving yard.

Forcing Yards.—For convenient replenishment of lambs for marking.

Lamb Marking Pen.—Third of three pens, two of which are used for drying pens.

Drafting Yards.—In which ewes and lambs are reunited.

BRANDING.—The branding and jetting yards are used as follows:

Counting Yards.—As holding and receiving yards.

Branding Race.—For branding or jetting.

FENCES

GENERAL.—The question of good, durable and safe fences for sheep yards is important. Whilst certain kinds of timber are undoubtedly the best, the choice is generally limited by the kinds available locally. The chief points to be considered are strength, resistance to decay, white ants, and fire. For sheep yards either the post and rail fence or split paling types are recommended. Both are illustrated overleaf.

POST AND RAIL FENCES.—Posts are to be 8'-10' apart. Round posts for corners are to be 7' long, 9"-12" diameter, sunk 3' in the ground. Split posts are to be 6' 6" long, sunk 2' 6" in the ground, minimum dimensions 6" x 3" for ironbark and 8" x 4" for split pine. Posts are mortised to rail gauge, size of mortice being dependent on the rail used. Rails are to be 6" x 3" minimum for four-rail fences as illustrated overleaf, and 8" x 3" minimum for three-rail fences. Four-rail fences are preferable, but in either case the height of the top rail should be 3' 6" to 3' 9". The tenons on the ends are to be 6" long, adzed carefully to fit into the mortices.

In drafting races and crushes, rails should be 6" x $1\frac{1}{2}$" sawn timber, checked flush into the posts.

PALING FENCES.—Perhaps the most satisfactory type of fence is the split paling fence. Posts and top rails are identical with the post and rail type. Under the rail two 8-gauge fencing wires are strained, and to these are wired palings.

Palings are 2' 6" long and approximately 1" thick, being split from large trees. Width to be whatever size obtainable up to about 7". As all pieces of the 2' 6" length of tree are used, this type of fence is most economical. Palings are levelled 2' 6" above the ground, and the other ends buried in a shallow trench. All palings are twitched with light gauge wire to the top and bottom wires.

GATES.—Frame up five- or six-bar gates to the width required. These are to be constructed of 3" x 1" hardwood, and should be painted white.

The gates of the main and drafting yards must be made wide enough to allow vehicles to move up to the trucking platform.

NOTE.—

1. Layout of yards is diagrammatic in many respects, and many owners will prefer to have yards with pens and crushes of tapering sides, so that sheep will not pack in corners of square or rectangular shaped yards.
2. If water is available it should be laid on to the yards, especially those most used. Piped water is of great value when working the yards in dry and dusty weather.

LYSAGHT
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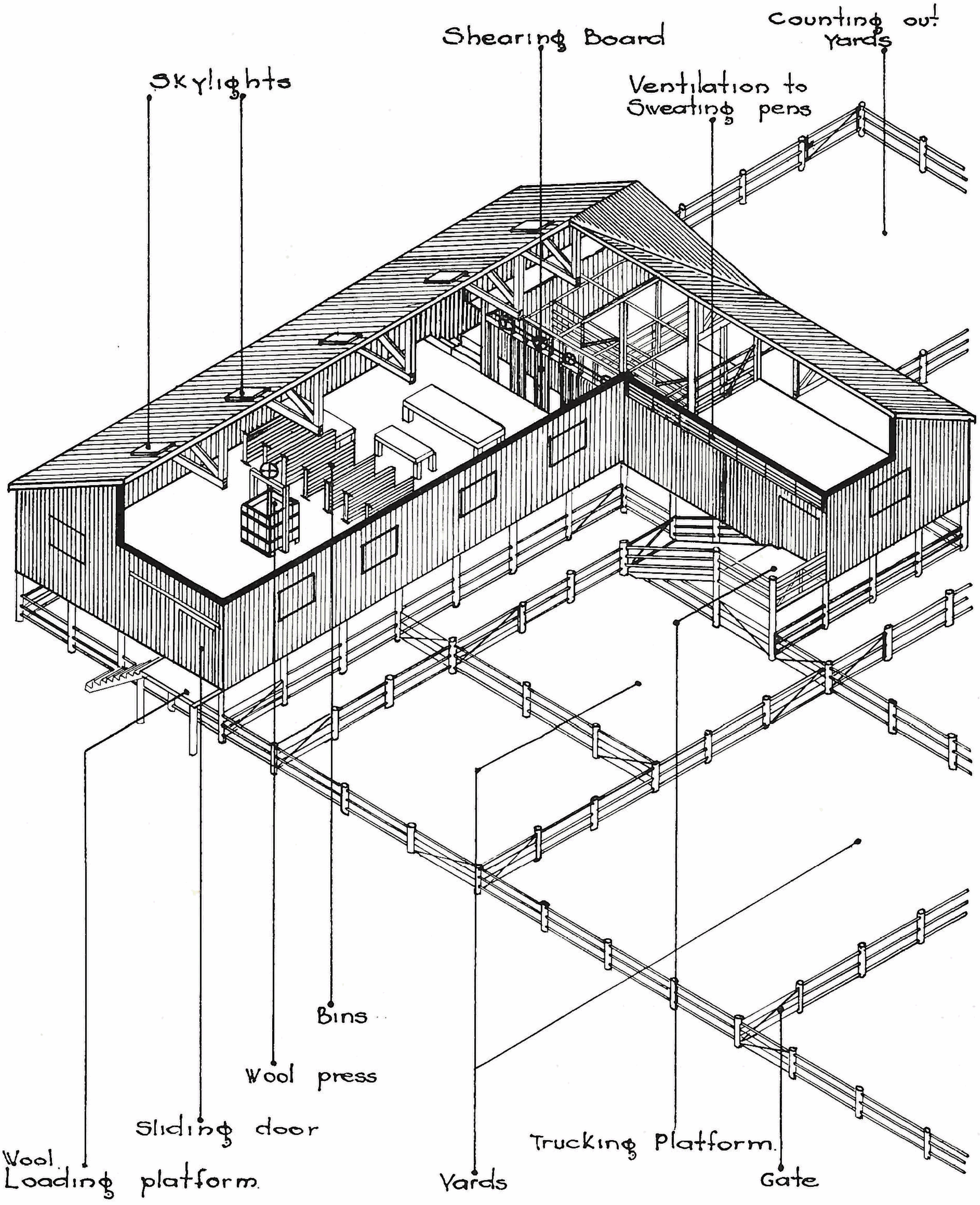
LYSAGHT'S
COUNTRY SERVICE

CUTAWAY VIEW OF SHEARING SHED AND WOOL STORE



SHEEP SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4223A

SHEARING SHED

GENERAL.—This outline specification refers to the isometric sketch overleaf, the plan of which is shown in sketch 4223B. Though dimensions specified throughout are for Australian hardwood, sufficient margin has been allowed for designs to be executed in cypress pine.

FOUNDATION STUMPS.—To be 9"-12" diameter bush timber, cut square, set a minimum of 2' into the ground and of a height above ground level as required (minimum 5', maximum spacing 7' 6" centres). Foundation stumps should be coated with creosote before erection and a 12"-14" square 24g. galvanized sheet ant cap fitted to top of stump.

WALL FRAMING.—Walls are to be constructed 10' high, measured from floor level to the top of the top plate. Framing is to be constructed with 4" x 2" studs at a maximum of 3' centres, checked into 4" x 2" bottom and top plates. Studs supporting trusses, corner studs, and door studs are to be 4" x 4" hardwood. 3" x 2" horizontal girts are housed into the 4" x 2" studs at suitable intervals to provide fixing for the economical use of 9' sheets of Lysaght's 26g. Red Orb.

Where required, a further 4" x 2" nogging piece is checked into the vertical studs 12" below the top plate to provide fixing for the ventilating panel. This ventilating panel is to be bird-proofed with ½" mesh galvanized wire netting carried over the top plate, under the galvanized iron roof, and fixed to the nearest purlin or batten.

FLOORING.—Floors of sheep pens are to be constructed of 6" x 3" bearers and 5" x 2" joists, spaced not to exceed 18" centres, and to be 12" centres under wool room floor. The grating to be of 2" x 1" battens with splayed edges, spaced ⅝" apart and double nailed to each joist.

The remainder of the floor of the shed to be of 4" x 1" T. & G. hardwood.

ROOF FRAMING.—Roof trusses to be framed up in 4" x 2" hardwood throughout. Each joint in the truss to be secured with ⅝" diameter bolts with square washers. Purlins are to be 6" x 3", spaced a maximum of 5' centres and supported by timber cleats, or 1" galvanized strapping taken down and around the principal rafters.

ROOFING.—The roof is sheeted with 26g. Lysaght's Red Orb or Red Zincanneal sheet, applied with side lap of 1½ corrugations and a minimum end lap of 6".

RIDGE CAPPING.—Ridging is to be of the 18" ventilating type, applied in 6'-8' lengths lapped at least 6" at the joints, and secured with the necessary brackets, screws, and bird-proof wire.

EAVES GUTTERS.—Eaves gutters should be provided, and the water discharged into galvanized tank storage. Gutters are to be 24g. Queen's Head galvanized iron or Zincanneal, beaded edge 5" quadrant type, in 6' or 8' lengths, and fixed in position with required falls to outlets.

VALLEY GUTTER.— Provide valley gutter at junctions of sweating pen structure and main shed, of 24g. flat galvanized iron or Zincanneal.

SKYLIGHTS.— Provide and fix, where required, skylights of a fixed unventilated type. Skylights are to be complete with condensation gutters, cappings, and clips.

WALL SHEETS.— Side and end wall framing is to be sheeted with 9' lengths of 26g. Red Orb iron or Red Zincanneal sheet, one corrugation side lap.

PENS.— The catching, forcing and sweating pens to be constructed of 4" x 4" studs, carried up to the bottom of truss tie beams, top plates of 4" x 2" to be provided, where required. Spacing of studs not to exceed 5', and to be well spiked down at the bottom to the floor members. Rails to be 3" x 1½" timbers, spacing not to exceed 6", placed alternatively on opposite sides of studding. Height of fence to be 40"-42".

GATES.— Gates can be either of the swing type, or the counterbalanced lift-up type, framed up in 3" x 1½" timbers.

DOORS TO SHEARING BOARD.—To be 5' 0" high, 30" wide, in two leaves, each leaf to be constructed with 3" x 1½" hanging stiles, 4" x ⅝" T. & G. and V.J. lining, fixed to 4" x 1" ledges. Hinge each leaf with two 4" double-acting spring hinges.

CHUTES.—Construct the chutes with 4" x 1" T. & G. lining nailed to 4" x 2" framing. From the ends of the chutes run fencing to the counting pens with rails of 6" x 1½" spaced 6" apart, doubly nailed to stumps.

DOORS.—Provide sliding doors on runners for loading platform and entry to sweating room, the doors sliding internal to the building. Doorways to be 7' high, doors 7' 6" high, to have 6" x 2" styles and head, 8" x 1" bottom and middle rails, braced adequately with 6" x 1" timber. Sheet with 4" x 1" T.G.-V.J. The Engine Room to be fitted with framed, ledged, braced and sheeted door, covered with corrugated iron sheet (one 6' length 10-3" corrugations sheet).

SHAFTING BEAM.—For the shafting board, fix a 10" x 4" beam, at a height to suit machine used, secured with ⅝" diameter bolts to 10" diameter timber round posts passing through the floor and sunk into the ground. Posts are well braced in order to prevent vibration.

ENGINE ROOM.—The engine room to be provided with a concrete floor, sloping to draining sump and set up with necessary engine and grinding machine blocks. Stairway of 8" x 2" stringers and 2" decking to be provided for entry into main shed. Office floor of 4" x 1" T. & G. timber set on 4" x 2" joists to be provided over the top of the engine room.

WOOL TABLE.— Wool table to be 10' x 5' x 3' high, 4" x 4" legs, 5" x 2" top rails, 3" x 2" centre rail, 4" x 1½" stays and braces, and the top of 1" square rods housed cornerwise into rails 12¾" centres. Fix to table legs at floor level 12" x 1" movable boards.

CLASSER'S TABLE.—Provide a table 6' x 2' 6", 3' high, sheeted with dressed 1" timber.

PIECE PICKING TABLE.— A 6' x 3' piece picking table to be framed up of 4" x 4", sheeted with dressed 1" timber, the whole to slope towards the fleece and piece bins.

WOOL BINS.— To be constructed with 3" x 2" framing, sheeted with 26g. Red Orb galvanized sheet. Each bin to be 9' x 3' x 6' high. Ends of sheets to be loosely held between ½" x ½" beading.

WOOL PRESS.— Provide four heavy foundation blocks and to these fix 6" x 4" bearers immediately under the press. Position to allow sufficient headroom.

WOOL LOADING PLATFORM.— The wool loading platform to be built up with round posts not less than 8" at the small end, trimmed, creosoted, and ant capped. These to carry 6" x 4" bearers, 4" x 2" joists, and 4" x 1" flooring with spacing of ½" between boards. Steps up to be provided, having two 8" x 2" stringers, and two 4" x 2" treads set ½" apart to each step.

ENTRY RAMP.—To be built of round posts not less than 6" at the small end, 6" x 3" bearers, 4" x 2" joists, 4" x 1" decking for ramp, and 2" x 1" battens for loading platform. Provide a drop gate framed of 4" x 1½" timbers, for use with vehicles when loading sheep.

SHELTER PENS.— Complete that portion of the shed under T. & G. flooring into shelter pens as required by four 6" x 1½" rails spaced 6 inches apart and housed into foundation posts or truss columns. Swing gates of 4" x 1" timber joined and braced are to be placed where required.

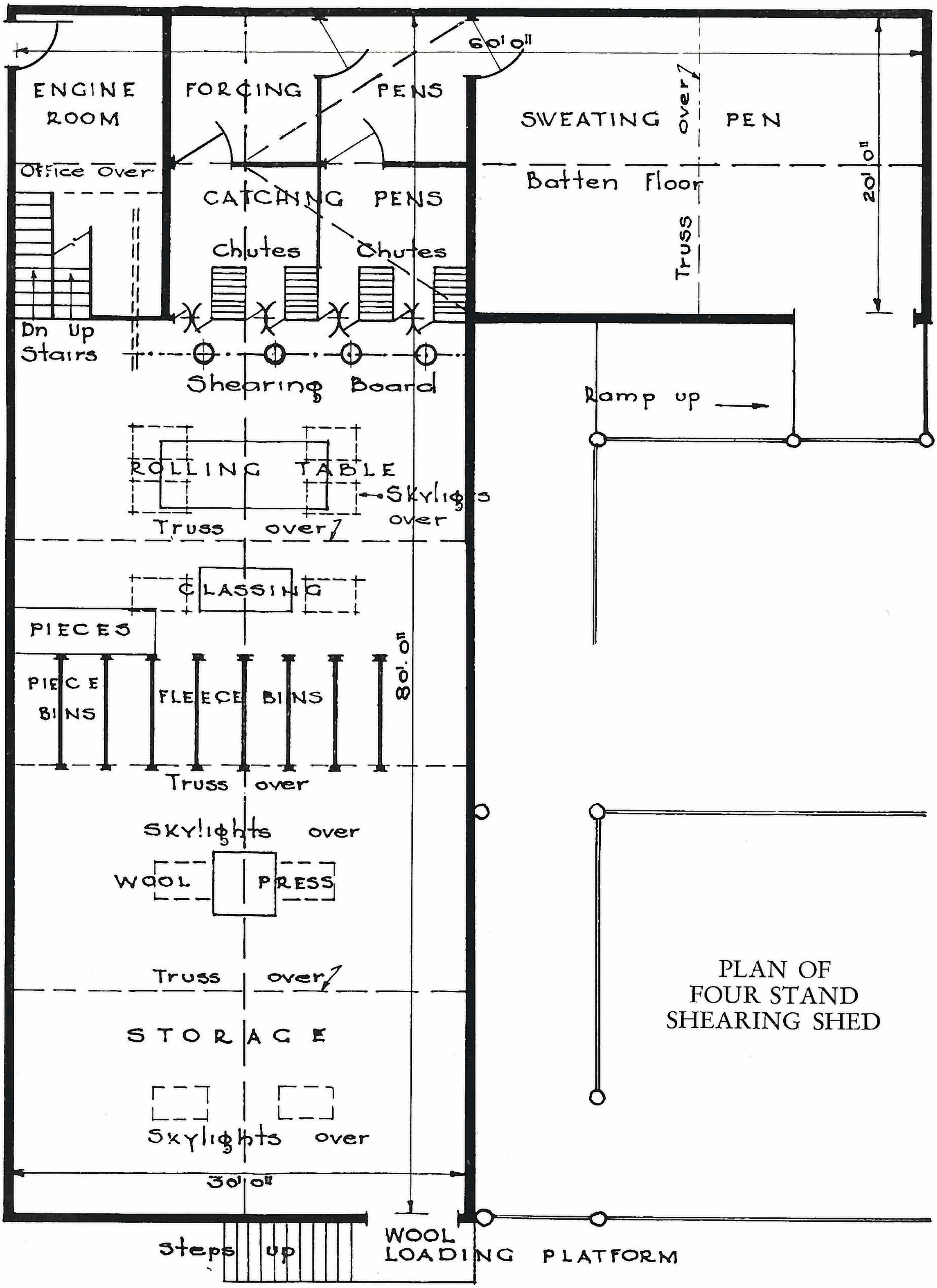
COUNTING-OUT PENS.— Complete with 6" x 1½" rails that portion of the shed under the batten floor of the catching and forcing pens into counting-out pens, as required.

SHEEP SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4223B

SHEARING SHED



PLAN OF
FOUR STAND
SHEARING SHED

SHEEP SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4223B

SHEARING SHED

GENERAL.—As the construction of a shearing shed involves a relatively large outlay, much forethought should be given to the planning of the structure and its relation to the adjacent yards. One of the main considerations in planning is that the shed receives plenty of natural light. This can be provided most economically by the use of skylights, though there is no doubt that if expense is not a controlling factor then the saw tooth type of roof provides the best lighting. Sheet 4233A approximates in contents to specifications, this sheet shows what considerations led to the design.

DESIGN.—The design of the shearing shed is governed in the main by the number of shearing stands it is proposed to install. Four-stand sheds are most common, and such a stand is described overleaf. The designing commences at the "shearing board," and works either forward of the board as the wool flows, or back from it through the various sheep pens.

The space allowed per sheep varies according to the breed of sheep, from 3.5 to 4 sq. ft. per animal, but 4 sq. ft. is a good figure to use in all practical designs.

SHEARING BOARD.—The board is that part of the shed where the shearing is actually done. A minimum of five feet length of board, per stand, should be allowed. As rectangular sheds are generally built 20'-30' clear span, 4-6 stands can be allowed per width of shed on the "follow through" principle. A four-stand shed needs 20' minimum span. The width of the board from catching pen gates to rolling table should be 8'-10'.

PENS.—The division of the inside of the shed into pens depends on several requirements.

1. The "follow through" principle should be observed, i.e., the sheep move continuously forward until they reach the shearing board, and the wool moves continually forward until it is loaded.
2. The size of the various pens should be multiples of one another. This facilitates the handling of sheep.
3. The sweating pens, together with the catching and forcing pens, should hold half to one full day's shearing.
4. All gates should be arranged in the corners of the various pens.

Pen requirements in the rear of the board are also connected with the overall sheep-holding capacity of the shed, both for sheep in the pens and the shelter pens. No fast rule can be employed, but in regions subject to rain, a total of two days' capacity at 100 sheep per man should be aimed at. In very dry areas one day's holding should be sufficient. Most sheds are a compromise between these figures.

CATCHING PEN.—The first pen to consider is the catching pen; having first decided whether one or two shearers will catch to a pen. Each pen should hold an hour's shearing per man minimum. Battens comprising the floor of the catching pen should be laid at right angles to shearing board, and not parallel to it.

Catching pen doors should be double hinged, the additional expense of double acting hinges being well worth while when it comes to the operation of the shed.

EXIT CHUTES.—Every shearer must have his own particular counting-out pen, to which his chute leads. A gradual slope is essential, with a batten here and there across the slope. A piece of sacking swinging loosely from the roof of the chute prevents draughts and light coming up to the board.

FORCING PENS (Back Pens).—Either the same size or increasing multiples of the catching pens.

SWEATING PENS.—To hold about half a day's shearing.

PEN FENCES.—To be 40"-42" high, and constructed of seven 4" x 1" rails checked into 4" square uprights. It is a wise plan to place 4" x 1" rails on the studs around the walls of the shed, when these form part of the pens.

FLOORING OF PENS.—Battens should be bevelled on one, or preferably both, sides. Spacing is important, for, if too narrow, the floor will not remain clean, and if too wide, the sheep will be restless. $\frac{5}{8}$" is the optimum distance between battens.

PEN GATES.— Gates can be of the swing type as illustrated, or the counterbalanced lift-up type, which admittedly, though more expensive, must be considered where pen space is limited.

COUNTING-OUT PENS.—To hold two hours' shearing per man.

ROLLING TABLE (Wool Table).—This must be large enough to take a complete fleece. 10" x 5' x 3' high is a convenient size. Some operators prefer bars set on edge to rollers. If square battens set on edge are used, 1"-1$\frac{1}{2}$" are convenient sizes. However, for those who prefer rollers, all-steel tables are now made with conduit for rollers. Conduit moves quickly to a light touch.

Removable boards may be placed between the bottoms of the legs to help keep the locks in place. Alternatively, sacking (old wool bale containers) should be draped around the table.

CLASSING TABLE.—The classer's table is so placed that he has good light, can attend to his work, and at the same time be near to the rolling table and wool press.

WOOL BINS.—The main fleeces should go into bins immediately behind the class. These bins should also have an opening at the back near the press. Allow plenty of wool bins (six is a convenient number). They should be large enough to hold a bale and a half of wool each. This requires 100 cubic feet of space. 9' x 3' x 6' high is an ample size.

PIECE PICKING TABLE.—Pieces can be divided, as a rule, into firsts, seconds, and stained—consequently three receptacles are provided. The piece picking table should be sloping away from the picker in a good light, with the firsts and seconds bins directly behind the table. Either a third bin or a wool bale sack hung to one side is the usual container for stained pieces, so that it can simply be unhooked for the purpose of carrying the contents away.

BALING PRESS.—Provide solid stump foundations directly under the baling press.

WOOL ROOM (Storage).— Provide area to suit storage required; at least two days' shearing, reckoning on average daily output of 10 bales per four-stand shed.

LOADING DOOR.—Should be on rollers and track rather than the hinged type.

ENTRY RAMP.—The entry ramp at the entrance of the shed can also be used for loading sheep into vehicles.

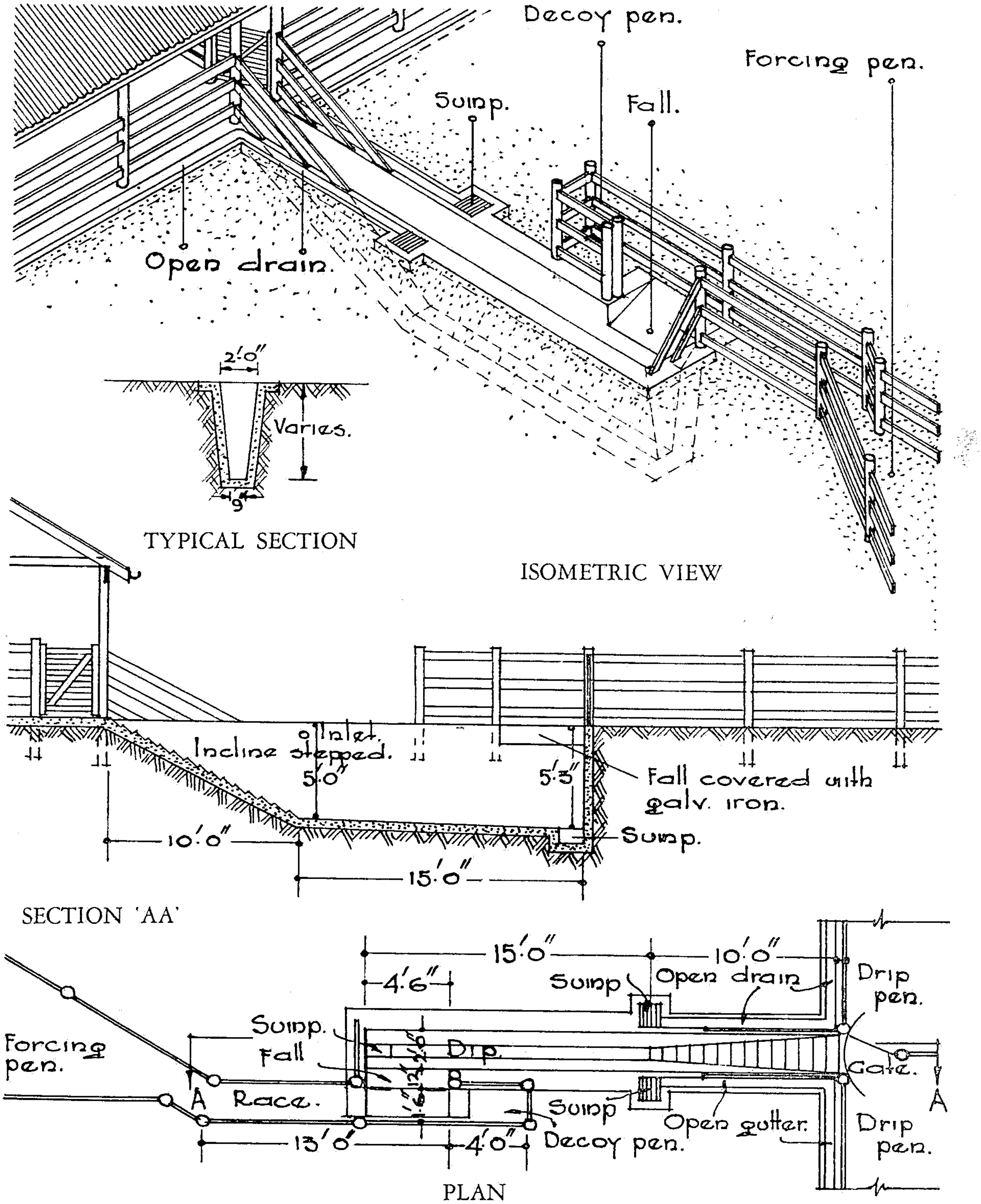
ENGINE ROOM.—This can be part of the shed as shown, or in a separate lean-to. In this design, the floor of the shed is sufficiently high off the ground to provide an engine room at ground level and overhead a small office.

FOUNDATIONS.—The shed can be carried either on concrete piers 6"-8" square, or round hardwood stumps spaced 5'-7' apart to suit the shed design.

SPACE BELOW SHED.—It is strongly recommended that provision be made for sheltering sheep under the floor of the shed itself. This is particularly necessary where cold and wet conditions are likely to occur during shearing, and is handy, both for keeping woolly sheep dry and shorn sheep sheltered. Apart from counting-out pens, the space under the batten floors should not be used for shelter, by reason of the sheep droppings.

At least six feet clearance should be provided to allow of cleaning out under the gratings, and the handling of the sheep below the wool room floor.

SHEEP DIP — SIDE SLIDE



TYPICAL SECTION

ISOMETRIC VIEW

SECTION 'AA'

PLAN

SHEEP SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4233

SHEEP DIP — SIDE SLIDE

GENERAL.—It is not proposed to go into the relative merits of "swim" dipping and "spray" dipping in these sheets. Both systems are commonly used, and this sheet describes the concrete construction used for side entry "swim" dipping, while Sheets 4235, 4236 describe the galvanized sheet structures used for spray dipping.

In the choice of the type of "swim" dip, the owner should be guided largely by the size of his flock and the associated yard lay-out. The length of the dip must be sufficient to ensure thorough immersion and allow the liquid to work right through to the skin of the animal.

SITE.—The site of the dip may affect the whole yard layout in the handling of the sheep. A position should be chosen which can be readily drained and kept thoroughly dry. It is an advantage to have the dip so located that by placing a short length of pipe in the installation the bath can be drained at will. Alternatively, a pump can be provided for pumping out the dip.

DIMENSIONS.—The dip should not be shorter than 25 feet. In general the depth is 5 feet, but this varies at the rate of 1" fall per 10 feet of length. The width of a section of a dip is 2 feet at the top, and 9"-10" at the bottom.

The fall or "walk-in" section has a gradient of 1 in 2 starting from the top, and leading down to a height of 12"-18" from the bottom of the tank, the last 12"-18" being a sheer drop.

The gradient at the exit of the bath should not be steep. This should be 1 in 4 if a smooth incline, or if stepped as shown (to reduce the length of the dip), 1 in 2.

EXCAVATION.—The dip should be excavated to the dimensions shown on the sketch. Providing the ground will stand, the sides should be neatly trimmed and the bottom cut to an even grade. This natural soil can then be used for formwork for pouring concrete.

FORMWORK.—The formwork against which the concrete is poured consists of sheeting laid on 3" x 2" "A" frames. This sheeting can be either 6" x 1" timber or flat Lysaght's Queen's Head galvanized sheet. "A" frames are spaced at 3'-4' centres, and if sheeting with flat galvanized iron longitudinal battens are placed on the "A" frames to carry the steel sheet. The legs of the "A" frame are braced from side to side with 4" x 2", or 3" x 2" timbers. The surface of the sheeting against which the concrete is going to be poured should be coated with old cylinder oil or lime wash, before concrete is poured. If the natural ground will retain its form, then the earth is excavated and neatly prepared to take the reinforcing and subsequent concrete. For very dry weather this earth should be thoroughly damp before the concrete is poured.

REINFORCEMENT.— It is important to reinforce the concrete walls with steel. The most economical reinforcement is steel rod mesh, which can be bought in roll or sheet form. As a rough measure, wire netting can be used, strengthened with short lengths of rod or steel fencing posts. The reinforcement is placed in position and stayed, or wired, so that it will not shift while the concrete is being poured and packed.

CONCRETE.—The concrete should consist of 1 part cement, 3 parts sand, and 5 parts metal, the latter broken to $\frac{3}{4}$" gauge.

It will not be possible to pour the complete construction in one day, and as the junction of old concrete with new is likely to cause leaking joints, the joint must be carefully prepared. It is advisable, before placing concrete on that of the previous day, to allow a $\frac{1}{2}$" thick bed of mortar, gauged 1 part cement to 2 parts of sand. If this mortar is placed on a clean, wet surface, a proper junction will be made between the two concrete pours.

The walls of the dip are to be 6" thick, and the floor 4" thick. The floors should fall from one end at a slope of 1" in 10 feet to 1" in 12 feet.

When the walls have been constructed it is necessary, in order to make the dip watertight, to render or plaster the interior of the dip to a thickness of $\frac{1}{2}$" with cement mortar gauged 1 part cement to 2 parts sand.

CONSTRUCTION.—The following information on concreting has been written to indicate to the farmer how concrete, with its wide range of utility, can be made and applied to the farm. As a rule machine mixers are not available and the concreting has to be done by hand, in which case it should be mixed on a mixing board 10'-11' square. This board can be made of timber sheeting laid tightly on boards, to give almost watertight joints, or spaced boards sheeted with galvanized flat sheet.

The quantity of water used in concreting should be controlled, and only sufficient added to produce a plastic and easily workable material. The sand, cement aggregate having been measured into correct quantities, the sand and cement are mixed dry. Water is poured on to the dry mix, preferably from a sprinkler, and the gravel, which has been previously damped, added. The whole mass is then turned over two or three times, when the mixture is ready for pouring. The concrete is shovelled in as quickly as possible, and rammed with a pointed rod whilst placing.

A few days after the concrete has been poured the forms should be carefully moved, the walls wet and cement rendered to make them watertight. The same rendering should be given to the exposed surfaces of the dip or drains standing above the ground level. When the rendering is complete the surface should be covered with wet bags, or the complete dip covered with sheets of galvanized iron laid over the top of the dip. This is to avoid cracking by exposure to the hot sun. Wet bags always assist in the correct hardening or "curing" of the concrete.

DRAINING PENS.—Draining pens about 20' x 15' are generally built in association with dips. These are described in Sheet 4133. The floor should be raised some 12" above the top level of the dip. Drainage from these pens is carried back by correctly laid concrete drains and pipes to sumps and strainers at the side of the dip.

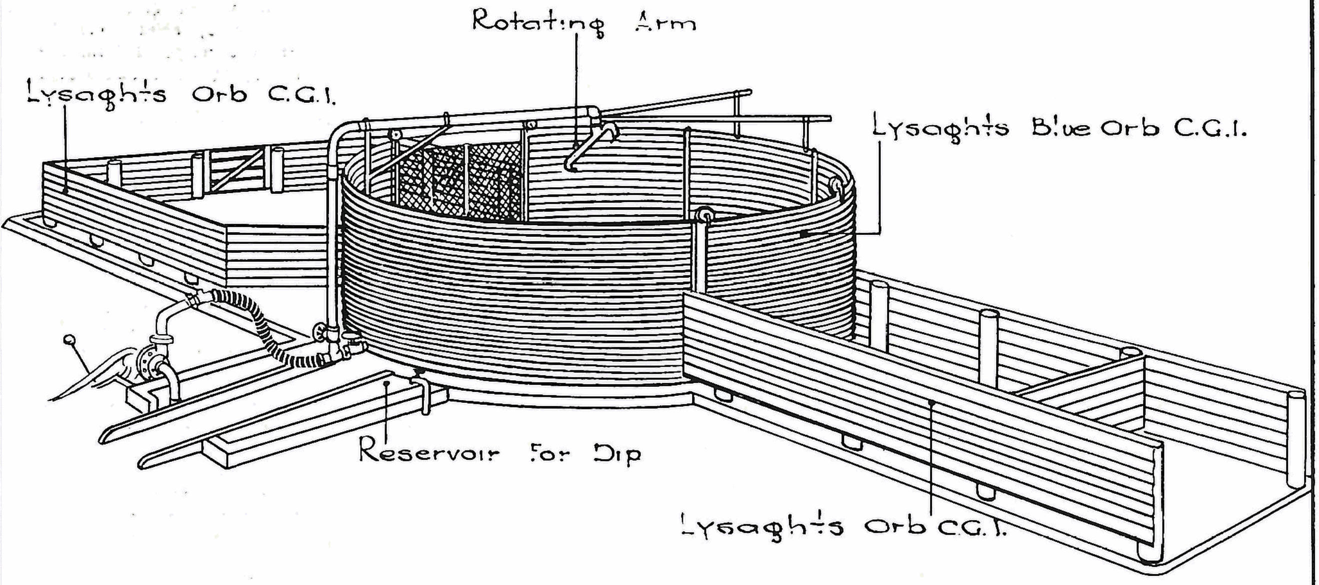
NOTE.—The modern trend is to use spray dips rather than concrete swim dips.

SHEEP SECTION

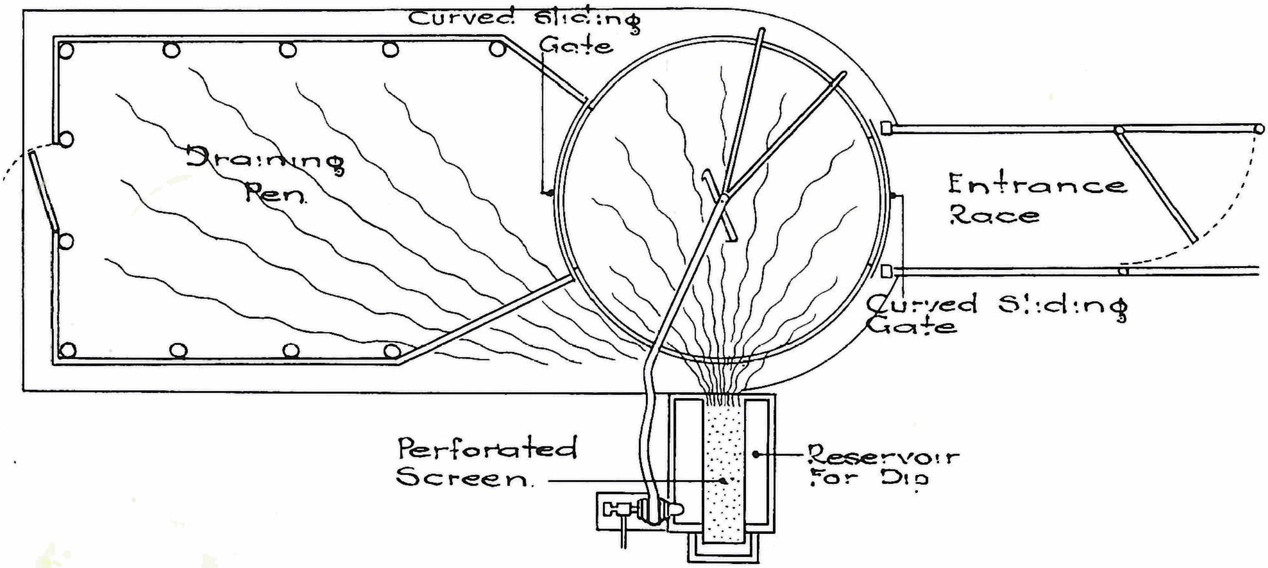
LYSAGHT'S COUNTRY SERVICE

SHEET 4235

BUZACOTT SPRAY DIP



PERSPECTIVE VIEW



PLAN OF DIP

BUZACOTT SPRAY DIP

GENERAL.—The Buzacott Rotating Power Spray Dip is designed to dip sheep for control of lice, ticks, etc., in a labour-saving, economical and effective way.

As illustrated, it consists of a circular corrugated iron enclosure. It has sprays arranged in rings on the floor, and overhead a rotating arm fitted with powerful sprays. This arm is designed to rotate slowly and provide the sheep with breathing gaps while the overhead sprays are operating. Both sets of sprays may be operated at the same time, but the makers recommend operation of one set at a time to provide the sprays with greater force for penetration.

These units are made in two sizes, to accommodate a minimum of 30 and 60 sheep. For a very large number of sheep two enclosures may be erected side by side and serviced by the same engine, pump, and reservoir, situated between them.

FOUNDATIONS.—Before the Buzacott Rotating Power Spray Dip can be erected it is necessary for groundwork such as foundations, drains, reservoir, etc., to be constructed. Frequently it is possible to use the old swim dip as a reservoir and to utilise the existing draining pens, etc. In most of the larger country towns there are contractors who are experienced in installing these units, and who will do so for a reasonable cost.

Detailed dimensions of the concrete foundations, etc., are given in the instructions for erection supplied by the makers.

Approximate materials required are:—

30 Size.		60 Size.	
30	bags cement	45	bags cement
2¼	cu. yds. sand	3½	cu. yds. sand
5	cu. yds. coarse gravel.	7½-8	cu. yds. coarse gravel.

FRAMEWORK.—The framework consists of galvanized piping. Uprights are 5' 4" in length, and are connected to the horizontals by split tee fittings. The framework is assembled as a unit, and rests on the concrete foundations. This enables the concrete work to be put in before the arrival of the Dip.

SHEETING.—Lysaght's Orb sheets are curved to fit the framework, and are attached to it by hook bolts. The 30 size requires 12-6' sheets of corrugated iron, and the 60 size 6-8' sheets and 6-9' sheets. Additional sheets are used on the entrance gate. The top and bottom edges of the corrugated iron should be facing outwards.

MECHANISM.—From 3 to 6 h.p. is required in the engine to drive this Dip, depending on the model required. The firm can supply petrol-kerosene engines, or if a tractor is available it can be used to advantage. The pump is a 1½"-2½" centrifugal, depending on the model required.

Gate valves are fitted to operate either top or bottom sprays at will, and if required an agitator can be provided to keep the mixture agitated whilst the sprays are not in operation.

The overhead spray is rotated by the force of the liquid, and its speed can be varied by adjustment of the angle of the end spray.

PAINTING.—The life of this unit can be materially increased by painting of both the galvanized steel sheeting and the galvanized piping with a suitable protective paint.

NOTE.—Detailed instructions for erecting are given by Buzacott-Wolseley Pty. Ltd., 7-11 Market Street, Sydney, with each of their installations, and further enquiries can be made by direct reference to the abovementioned firm.

LYSAGHT
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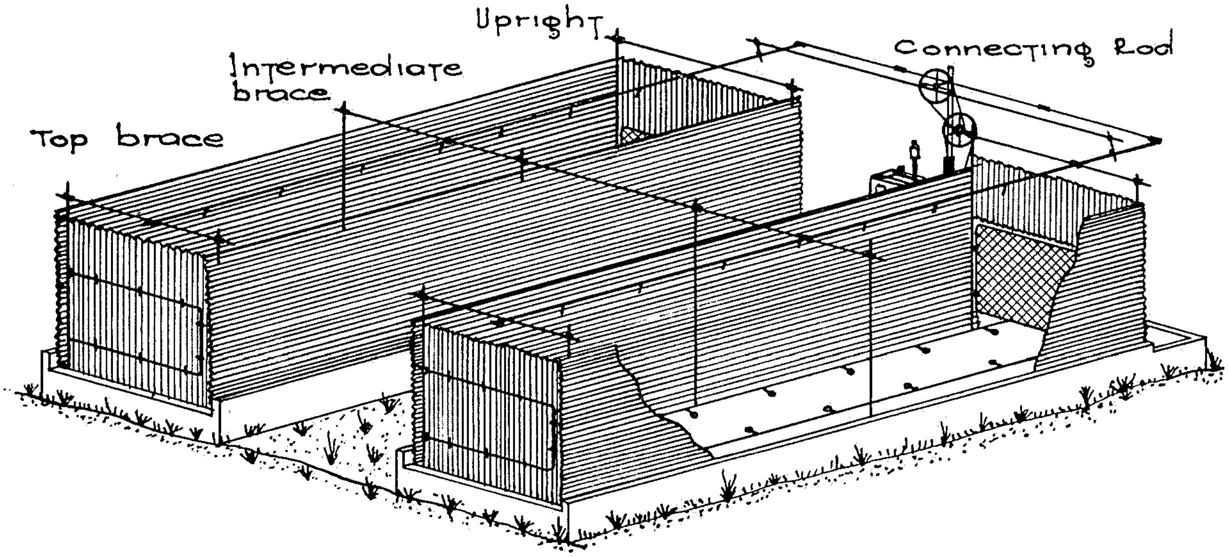
AUSTRALIA

SHEEP SECTION

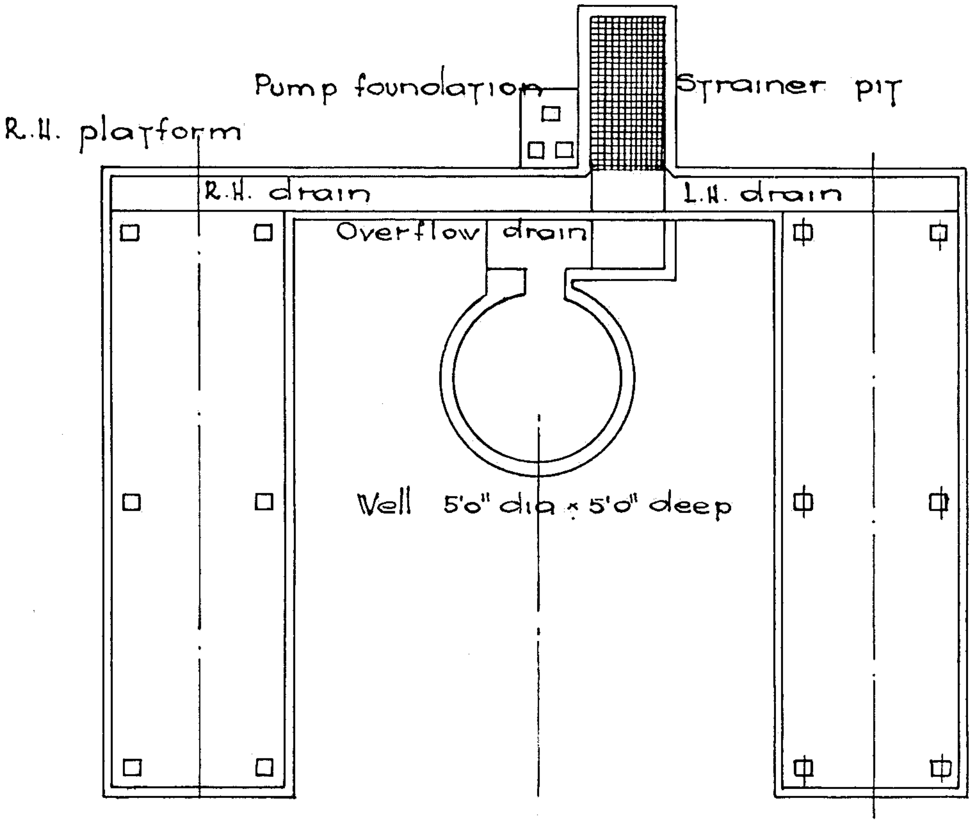
LYSAGHT'S COUNTRY SERVICE

SHEET 4236

COOPER SHEEP SHOWER



ISOMETRIC VIEW



PLAN

SHEEP SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4236

COOPER SHEEP SHOWER

GENERAL.—The Cooper Sheep Shower has been designed to meet the demand for an installation that is labour-saving, economical in operation, and effective with regard to sheep protection against ticks, lice, etc.

As illustrated, it consists of two corrugated iron enclosures of race design placed parallel to each other, about 10' apart, with a well between them. The pump delivers the dip wash to the shower platforms, per medium of mains and nozzles arranged overhead and on the ground, both showering at the same time.

FOUNDATIONS.—Before the Cooper Sheep Shower can be erected it is necessary for ground work such as foundations, drains, well, etc., to be constructed. A site must be selected that is as flat and as level as possible, but if a slope or fall exists, the shower platforms are built on the high ground side of the well to obtain the drainage required to the well.

The dimensions of the concrete foundations can be obtained from the firm supplying the spray, detailed erection instructions being given. Quantities of materials for foundations are:—

Double Race Unit Concrete throughout	Single Race Unit Concrete throughout
35 bags cement	24 bags cement
$2\frac{3}{4}$ cu. yds. sand	$2\frac{1}{4}$ cu. yds. sand
5 cu. yds. coarse gravel.	4 cu. yds. coarse gravel.

FRAMEWORK.— The framework consists of galvanized iron piping. Uprights vary in length, depending upon their position in the pen ($3\frac{1}{2}$" fall in the platform), and to whether they carry gate hinges or not. These uprights are connected along the length of the pen with longitudinal pipe braces, and across the top of the pen by top braces. With double pens, an intermediate brace connects the centre uprights of both pens together. The feet of the uprights are grouted into the concrete foundations.

SHEETING.—The framework is sheeted with Lysaght's Orb sheets, each shower pen having four 7' corrugated sheets for the sides. Additional short sheets frame the end gates. The necessary holes are drilled in the sheets for centreing, through which bolts are placed, fixing the sheets to the galvanized pipe frame work. Additional clips are provided to complete the fixing. The top and bottom edges of the corrugated iron should be facing outwards.

MECHANISM.— A small petrol engine is provided to drive a centrifugal pump for forcing the spray liquid through the pipes and nozzles. Both engine and pump are well set up on concrete bases.

In addition to driving the pump, the engine, through a series of belts, drives cranks for oscillating the top sprays of each pen. This mechanism of crank wheels, pulleys, and belts is carried on a heavy vertical standpipe in the vicinity of the pump. Long steel tube rods, driven by the crank wheel, are connected to crank drive links on each top spray, which oscillates in a stuffing box.

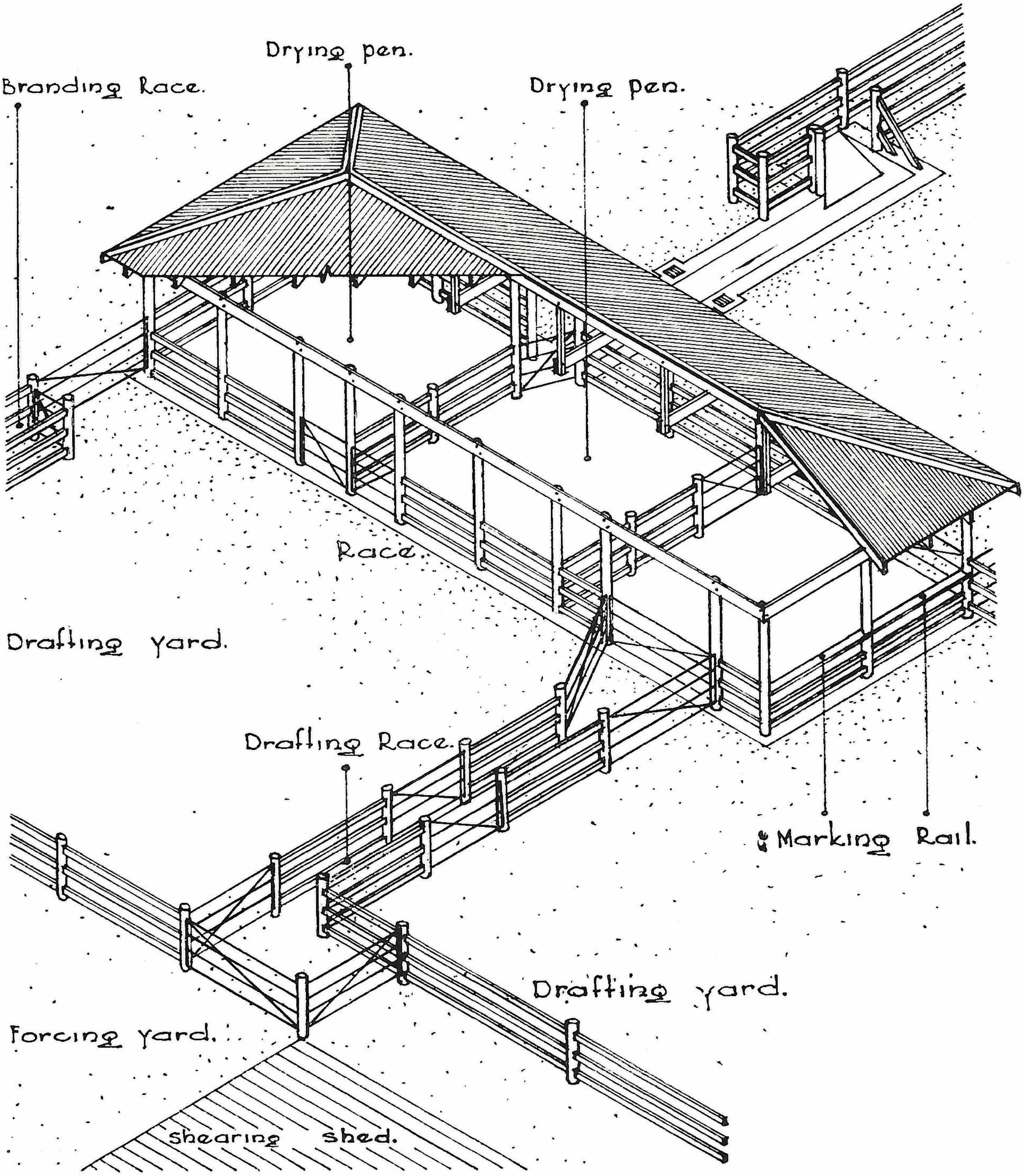
A three-way valve allows either left hand or right hand spray pen to operate individually or of both being shut off. Mechanical means of agitation of the spray fluid is provided in the installation by a spray agitator.

PAINTING.—The life of the spray unit can be materially increased by painting of both the galvanized steel sheeting and the galvanized piping with a suitable protective paint.

NOTE.—Detailed erection instructions are given by the Cooper Engineering Company with each of their installations, and further enquiries can be made by direct reference to the abovementioned firm.

LYSAGHT
ORB
AUSTRALIA

DRAINING, LAMB-MARKING PENS, ETC.



SHEEP SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4243

DRAINING PENS, LAMB-MARKING PENS, ETC.

GENERAL.—The structure shown in the sketch overleaf consists essentially of a hipped-roof, open-sided structure divided into three pens. Two are for draining dipped sheep, while the third can be used as a lamb-marking pen, or for a crush pen in sheep drafting. The two draining pens are used in conjunction with the side-slide dip, shown in the upper right-hand corner of the illustration, and described in more detail in Sheet 4233, while the third pen is used in conjunction with the drafting race and drafting yard, shown in the bottom left-hand corner of the sketch.

It must be remembered that this sketch is diagramatic in many respects; e.g., a three-rail fence is used to denote fences, whereas in actual fact most of such yard fences are four rails; races, crushes, and pen fences will be sawn timber, sunk flush with the post. Gates are in outline only, and no attempt has been made to show detail, such as the drafting handles on the drafting gates. It is also advisable to provide each shed with the necessary guttering and galvanized iron tanks to store water.

PEN FLOORS.—A convenient overall size for the structure is about 45' x 20', divided into three pens, each 15' x 20', the whole to have a 3" concrete floor with a 4" fall across the floor to wide, shallow drains outside the pen fences. A drain fall of approximately 1" per 12' should also be provided. Floor can either be concrete, as stated above, or placed stone, faced with a cement and sand slurry, and steel trowelled to a smooth finish. A suitable floor is constructed by placing stone down up to 6" size, wetting it, ramming well, and then pouring on top a sand-cement slurry (3:1), trowelling it to an even surface. If a concrete floor is used, it should be poured in sections, with expansion joints between sections.

POSTS.—Posts to be local hardwood or cypress pine, reasonably straight and not less than 6" at the small end, spaced as indicated on the sketch, and not to exceed 10'. These to be set 3' into the ground and well rammed, all timbers to be first coated with creosote, or hot tar, to above ground level. Top of posts to be scarfed out to take 6" x 2" top plates, and collar ties, holed for $\frac{1}{2}$" diameter cup-headed bolts, nuts, and washers. Lower sections to be cut to take rails of sheep fences, or fixtures for swinging gates.

ROOF FRAMING.—Construct the roof with 4" x 2" rafters, spaced not to exceed 36" centres, bird's-mouthed over wall plates, and projecting 12" clear of these plates, and plumb to line. Fix 8" x $1\frac{1}{4}$" ridge and hip boards, together with 4" x 2" collar ties, to each pair of rafters.

Roof to be strutted with 4" x 3" struts to tie beam carried across posts of pen fences. Posts of fences to finish at underside of tie beam. To each third pair of rafters, place 4" x 2" tie beam from plate to plate, bolted to feet of rafters. Battens, supporting roof sheeting, to be 3" x $1\frac{1}{2}$", spacing not to exceed 5'.

ROOF.—The roof is to be covered with 12' lengths of 10-3" corrugations 26g. Red Orb or Red Zincanneal sheets (the actual span of the building and overhang of rafters is adjusted in the design to suit the lengths of corrugated iron).

Sheets are fixed with a side lap of one and a half corrugations. Sheets span two batten spacings, and are secured with spring-headed roofing nails, pierced through the top of every second corrugation at end laps, and every fourth corrugation at intermediate battens.

RIDGES AND HIPS.—Ridge and hip capping should be of 24g. "Queen's Head" galvanized iron, 15"-18" wide sheets in 6' or 8' lengths (by slitting standard 30" wide or 36" wide sheets down the middle and formed to standard ridging).

Ridge and hip capping shall be lapped at least 6" at the joints, secured in position to purlins, in conjunction with roofing sheets, with spring-headed roofing nails.

EAVES GUTTERS.—4", 24g. "Queen's Head" galvanized iron beaded quadrant gutters should be fixed to the structure with required fall to galvanized iron tank. These are in 6'-8' lengths, lapped, double rivetted and soldered at joints, and secured to every rafter with 16g. galvanized brackets. Cut gutters to receive thimble connection of downpipe, and properly soldered at these junctions. Provide wire grating at downpipe outlet.

DOWNPIPE.—Provide and fix a 3" diameter 24g. round rainwater pipe, complete with all necessary bends and elbows, to carry water to storage tank.

FENCES.—All pen, dip and race fences should be of the post and rail type, constructed of 6" x $1\frac{1}{2}$" sawn timber, sunk flush into shed posts or fence posts. Height of top rail to be 3' 6"-3' 10", gap between rails not to exceed 6". Marking rail to be 6" x 2" on the flat.

FENCE POSTS.—To be 7' long round posts, not less than 6" diameter, sunk 3' into the ground. That portion sunk in the ground to be coated with creosote before placing.

GATES.—Width as required framed up in 4" x 2" and 4" x $1\frac{1}{2}$" timbers.

DRAFTING RACE.—The length and width of drafting races may be varied according to personal taste and method of drafting. A race about 20' long, 20" wide at entrance, narrowing to 16" wide at the drafting gate, is a convenient size. The sides can either be of timber rails, as shown, or of galvanized iron. If of corrugated iron, use 10' sheets of 10-3" corrugations, the bottom edge raised 6" above ground level and nailed to 8" diameter posts, at 4'-10" centres. Race should be multiples of 9'8", to use complete sheets of iron, nailed with a 4" lap.

Drafting gates should be light and strong, fitted with handles for classing operations, and so swung as to move easily to the touch.

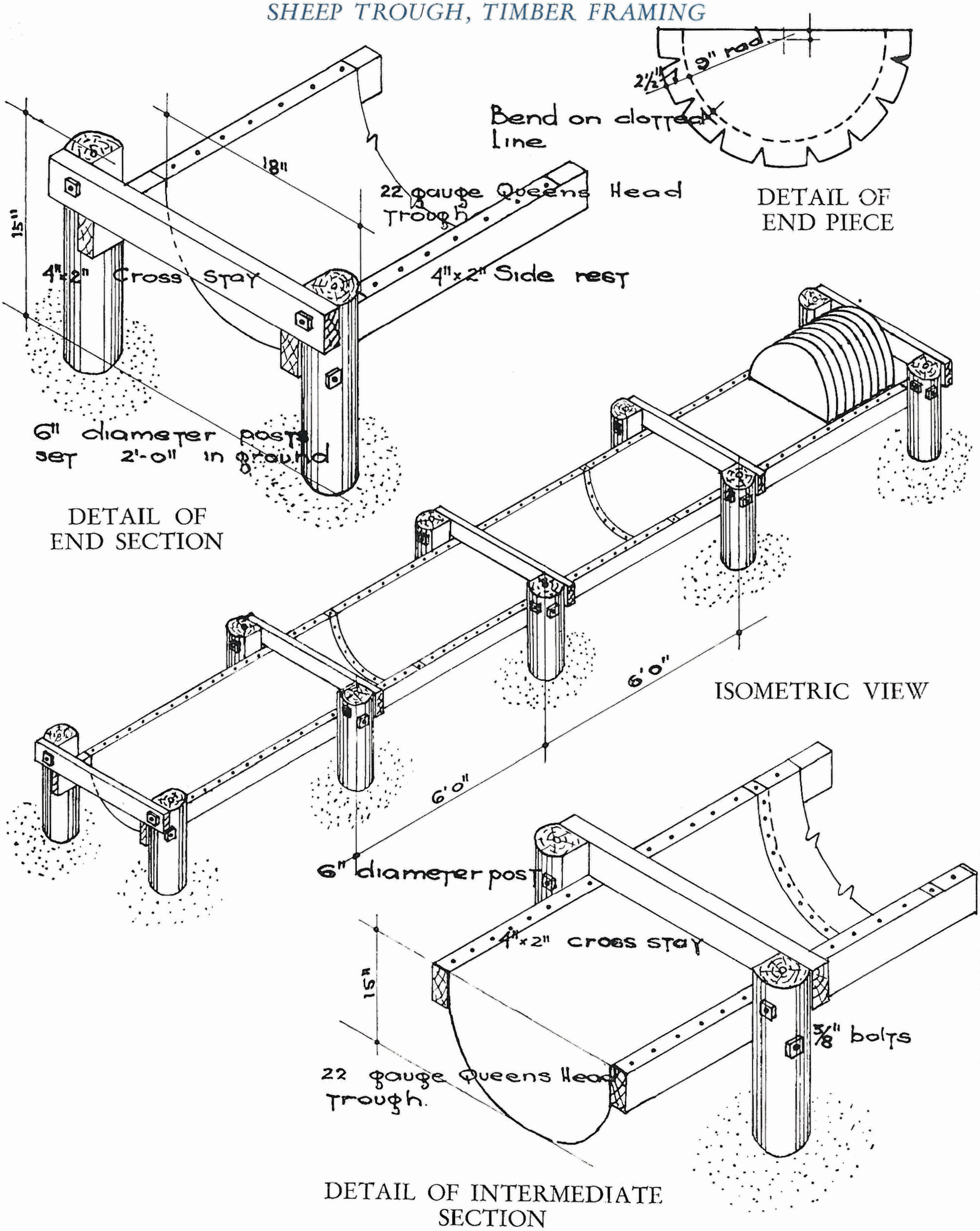
The floor of the race should be preferably concreted or, if not, corduroyed or flagstoned, to prevent the dust.

DIP.—This is described in Sheet 4233.

NOTE.—A galvanized iron roof will last longer if the end and side laps of the sheets are painted, before fixing, with zinc dust, red oxide, or any good quality roof paint. Unless zinc dust paint is used, the exterior surface should not be painted until the iron is weathered.

LYSAGHT
ORB
AUSTRALIA

SHEEP TROUGH, TIMBER FRAMING



DETAIL OF END PIECE

DETAIL OF END SECTION

ISOMETRIC VIEW

DETAIL OF INTERMEDIATE SECTION

SHEEP TROUGH, TIMBER FRAMING

GENERAL.—Sheep troughs are invariably made from galvanized steel sheet, fitted to steel or timber framework, and equipped with fittings for replenishing and emptying the trough. The simplest type is that illustrated overleaf.

SIZE.—By having the necessary width of galvanized sheet, either by cutting or joining standard width sheets, any cross section of trough can be made, but the advantage of making semi-circular troughing from standard width sheets is obvious. Consequently, standard practice is to build troughs out of the comprehensive range of widths supplied by Lysaght's in their "Queen's Head" flat sheets, viz., widths 24", 30", 36" and 48"; gauges for troughing 14g.-24g. Sizes are shown in tabular form at the end of this page.

At one time, it was common practice to have long, wide and deep troughs, even to the extent of using sections equivalent to half a galvanized tank, and these persist in the country to this day. Experience has shown, however, that it is better to have a shorter and smaller trough, with a full way float valve. With a good storage tank to feed each trough, the stock get fresh, clean and cool water quickly. Of the four sizes, the 15" x 7" and the 18" x 9" are the most common. These sizes are more rigid than the larger ones, sheep cannot fall into the trough, and there is not much water standing in it to be consumed before the fresh, clean water from the tank is available. Less water is wasted when the trough is cleaned regularly.

Sheets are 6'-8' long, and the trough is generally multiples of this size in length.

FRAMEWORK.—The framework consists of:—

4" - 6" diameter posts.
4" x 2" side rails.
4" x 2" cross stays.

The posts are sunk 18"-24" into the ground. That portion in the ground is tarred before placing and thoroughly rammed. Tops of posts are scarfed to take the side rails and cross stays, all being bolted with $\frac{3}{8}$" cup-headed timber bolts with nuts and square washers. Posts are to be sawn flush with tops of cross stays, after assembly of trough.

TROUGH BODY.—The trough body is made from the correct gauge "Queen's Head" galvanized sheet. The sheet is marked on either side $\frac{3}{4}$" to $1\frac{1}{2}$" in from the edge, ready for bending over and nailing to the side rails. The ends of the sheets are lapped $1\frac{1}{2}$" to form the complete trough, rivetted with tinmen's rivets at 3" centres, and soldered.

The end pieces are cut, as shown in the design, with serrations ready for flanging over. After flanging, the end piece is placed inside the curved sheet, rivetted at every second serration, and soldered to the trough body.

The trough is placed inside the side rails, adjusted, and folded to position, then nailed to the side rails with $\frac{3}{4}$" galvanized clouts, at 3" centres. Cross stays are then bolted to the posts.

FITTINGS.—The trough should be fitted with:—

Entry pipe and ball cock valve.
Ball cock valve cover.
Cleaning plug.

Ball cock valve covers can be purchased to fit all the sized troughs mentioned in the table below; alternatively, these can be made out of an old oil or petrol drum, or made out of flat galvanized 14g. sheet, braced with flat iron brackets.

NOTE.—(1) The ground surrounding the trough should be well drained, and, if possible, should be paved with flat stone or concreted.

(2) If the water used is bore water or from any other corrosive source, then it is advisable to paint the inside of the tank with a protective paint. A very good improvisation is the cement-linseed oil mix used for coating the inside of water tanks (when holding waters which are likely to attack zinc coatings.

(3) Heavy gauge troughs are used for combined cattle and sheep watering, light gauge troughs for sheep.

TROUGH SIZES—

Item	Size 1	Size 2	Size 3	Size 4
Width of sheet used	24"	30"	36"	48"
Gauge	24, 22	22, 20	18, 16	16, 14
Width of trough ..	15"	18"	21"	30"
Depth of trough ..	7"	9"	$10\frac{1}{2}$"	14"
Gals./ft. run	3.3	5.3	7.5	13.5

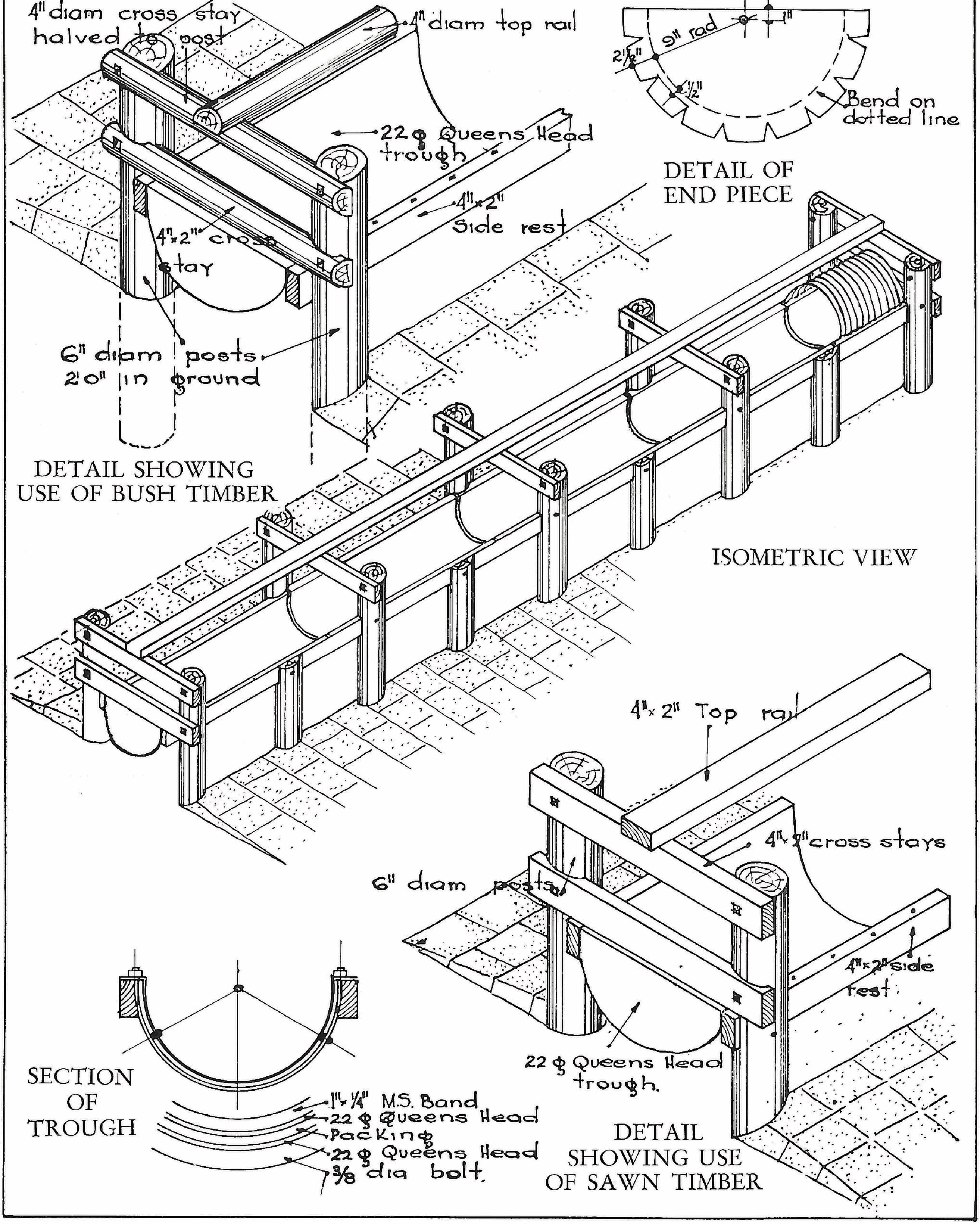
LYSAGHT
ORB
AUSTRALIA

SHEEP SECTION

LYSAGHT'S
COUNTRY SERVICE

SHEET 4263

SHEEP TROUGH, TIMBER FRAMING



DETAIL SHOWING USE OF BUSH TIMBER

DETAIL OF END PIECE

ISOMETRIC VIEW

SECTION OF TROUGH

DETAIL SHOWING USE OF SAWN TIMBER

SHEEP SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4263

SHEEP TROUGH, TIMBER FRAMING

GENERAL.—Sheep troughs are invariably made from galvanized sheet steel, fitted to timber or steel framework and equipped with the necessary fittings, for replenishing and emptying the trough. Overleaf is illustrated a timber framework type of troughing. A number of well-known firms supply this troughing in prefabricated end and inner sections, which can be clamped together, in conjunction with a locally built timber framework, to form a complete trough.

SIZE.—Standard practice is to build troughs from the comprehensive range of widths supplied by Lysaght's in their "Queen's Head" flat sheets. These are supplied in 14 gauge to 24 gauge, widths 24", 30", 36" and 48". Sheets are 6'-8' long, and the troughing is generally supplied in multiples of this length. Capacity of troughs is shown in tabular form at the end of this page.

At one time, it was common practice to have long, wide and deep troughs, but experience has shown that it is better to have a shorter and smaller trough with a full way float valve. Of the four sizes, the 15" x 7" and 18" x 9" are the most common. These sizes are more rigid than the larger ones, sheep cannot fall into the trough, and there is not so much water standing in it to be consumed before fresh, clean water is available. Watering arrangements are improved by having alongside each length of trough a good galvanized iron storage tank.

FRAMEWORK.—The framework consists of:—

4" - 6" diameter posts.
4" x 2" side rails (rests).
4" x 2" cross stays and top rails, if in sawn timber.
4" diameter cross stays and top rail, if in bush timber.

The posts are sunk 18" to 24" into the ground, that portion in the ground being tarred before placing, and thoroughly rammed. Tops of posts are scarfed to take the top cross stays, and halved to take the intermediate cross stays and side rails. Posts are to be sawn flush with top cross stays, after assembly of trough, top cross stays to be joined longitudinally by a top guard rail. The framework to be bolted together with $\frac{3}{8}$" diameter cup-headed timber bolts, with nuts and square washers.

TROUGH BODY.—The trough body is made up on the site or supplied prefabricated, in end sections and inner sections. End sections are made from the appropriate gauge galvanized sheets, with edges flanged over, ready for nailing to side rails. An end piece is rivetted and soldered to one end of this section. This end piece, with serrations as illustrated overleaf, is cut from the appropriate gauge sheet, flanged up and rivetted in every second serration to the body of the trough, prior to soldering.

Inner sections are marked and folded over at the edge, ready for nailing to side rails. The timber framework, less intermediate and top cross stays and top rail, being ready for fixing the trough, the inner and end sections are placed in position. These sections are joined by placing between the lap a felt insert, soaked in red lead-linseed oil mix. The joint is completed by tightening up a threaded, curved bolt against a clamp strap, as illustrated in the cross section overleaf.

FITTINGS.—The trough should be fitted with:—

Entry pipe and ball cock valve.
Ball cock valve cover.
Cleaning plug.

Ball cock valve covers can be purchased to fit all the sized troughs mentioned in the table below; alternatively, these can be made out of an old oil or petrol drum, or made out of flat galvanized 14g. sheet, braced with flat iron brackets.

NOTE.—(1) The ground surrounding the trough should be well drained and, if possible, should be paved with flat stone, as illustrated, or concreted.

(2) If the water used is bore water or from any other corrosive source, then it is advisable to paint the inside of the tank with a protective paint. A very good improvisation is the cement-linseed oil mix used for coating the inside of water tanks (when holding waters which are likely to attack zinc coatings).

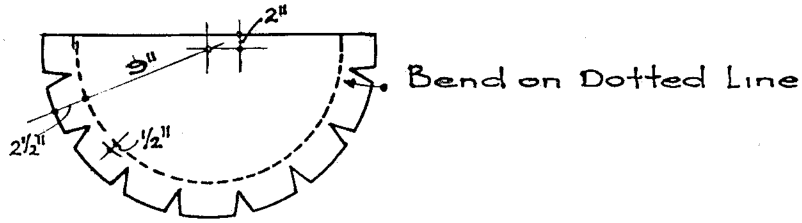
(3) Heavy gauge troughs are used for combined cattle and sheep watering, light gauge troughs for sheep.

TROUGH SIZES—

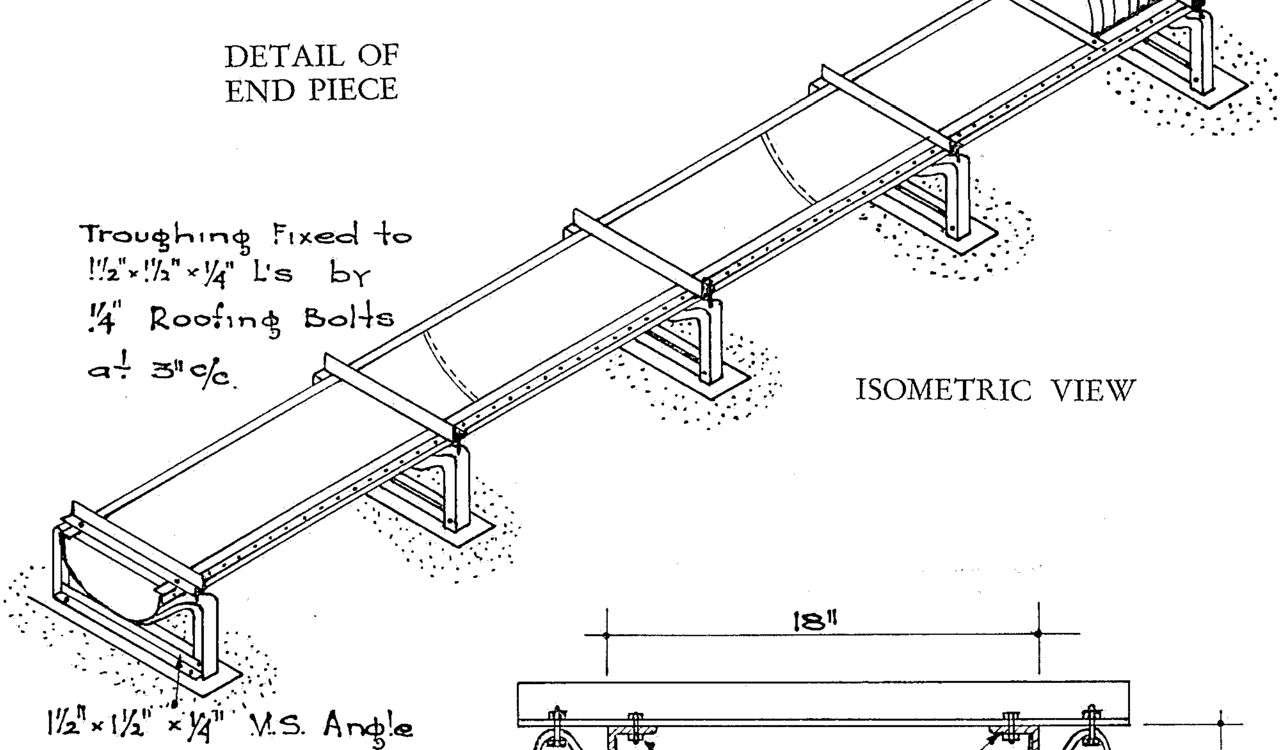
Item	Size 1	Size 2	Size 3	Size 4
Width of sheet used	24"	30"	36"	48"
Gauge	24, 22	22, 20	18, 16	16, 14
Width of trough ..	15"	18"	21"	30"
Depth of trough ..	7"	9"	10½"	14"
Gals./ft. run	3.3	5.3	7.5	13.5

LYSAGHT'S COUNTRY SERVICE

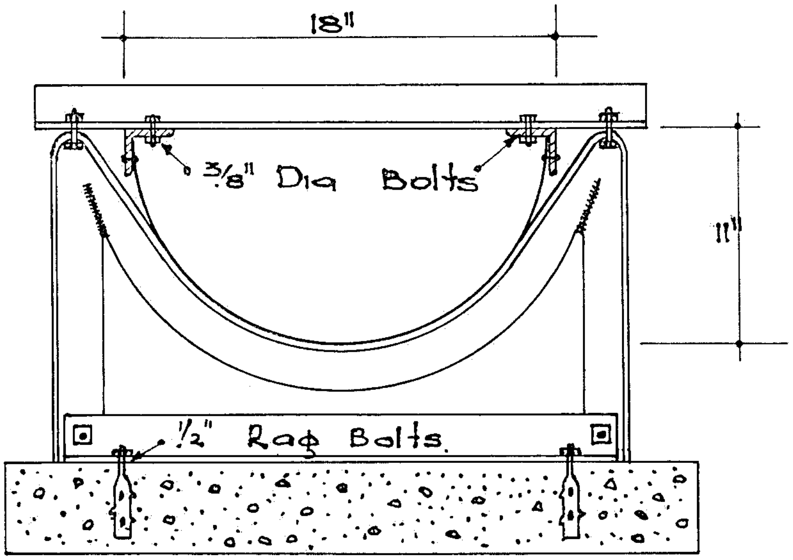
SHEEP TROUGH, STEEL FRAMING



DETAIL OF END PIECE


Troughing Fixed to 1½"×1½"×¼" L's by ¼" Roofing Bolts at 3" c/c.
1½"×1½"×¼" M.S. Angle

ISOMETRIC VIEW



CROSS SECTION THROUGH TROUGH

SHEEP SECTION

LYSAGHT'S
COUNTRY SERVICE

SHEET 4266

SHEEP TROUGH, STEEL FRAMING

GENERAL.—The steel-framed, galvanized sheet lined, sheep watering trough is commercially made in prefabricated units. A variety of shapes in steel frames exist, and Sheets 4204 and 4265 serve to illustrate types in common use. The construction can be such that joints are rivetted and soldered as shown, or clamped together with a felt insertion between the lapped sheets of iron.

SIZE.—Established practice is to build troughs from Lysaght's galvanized sheet, and though the gauge of sheet varies from 14g. to 24g. (dependent on the sturdiness required), the range of capacities per foot run is controlled by the standard width sheets available. Consequently there are four sizes in common use, corresponding to 24", 30", 36" and 48" wide sheets. Sheets are 6' to 8' long, and the troughing is generally supplied in multiples of this length. Capacities of troughing are shown in tabular form at the end of this data sheet.

At one time it was common practice to have long, wide and deep troughs, but experience has shown that it is better to have a shorter and smaller trough with a full way float valve. Of the four sizes the 15" x 8" and the 18" x 11" are the most common, these sizes being more rigid than the larger ones. Sheep cannot fall into the trough, and there is not much water standing in it to be consumed before fresh, clean water is available. Watering arrangements are improved by having alongside each trough a good galvanized iron storage tank.

FRAMEWORK.—The framework of trough supports, bottom pieces, cross stays and side rails is constructed of 1½" x 1½" angle iron throughout. Length of 1½" x 1½" angle iron is notched at the appropriate points and formed to shape, providing a semi-circular trough support with two vertical legs.

All angle iron joints are made with ⅜" diameter hexagonal bolts and nuts. A horizontal cross stay to each trough support carries horizontal angle section rails, to which is fastened the trough sheeting.

TROUGH BODY.—The trough body is made from required gauge galvanized sheet. Sheets are fastened to the inside of the side rails with ¼" galvanized screws and washers. Adjacent sheets are lapped 1½", rivetted with tinmen's rivets at 3" centres, and soldered. Serrated end pieces are cut as shown in the sketch, with serrations ready for flanging over. After flanging, the end piece is placed inside the curved sheet, rivetted at every second serration, and soldered to the trough body.

FOUNDATIONS.—The trough supports are carried on concrete slabs or timber baulks (old railway sleepers). If concrete is used, as shown in the sketch, ½" diameter rag bolts are set in concrete and bolted to the bottom pieces of the framework.

FITTINGS.—The trough should be fitted with entry pipe and ball cock valve, ball cock valve cover, and cleaning plug. Ball cock valve covers can be purchased to fit all the sized troughs mentioned below. Alternatively, these can be made from flat galvanized 14g. sheet, braced with flat iron brackets, or old petrol drums.

NOTE.—(1) The ground surrounding the trough should be well drained and, if possible, should be paved with flat stones or concreted.

(2) If the water is from a corrosive source, e.g., some bore waters, then it is advisable to paint the inside of the tank with a protective paint. A cement-linseed oil mix, sometimes used for coating the inside of water tanks, is a suitable mix.

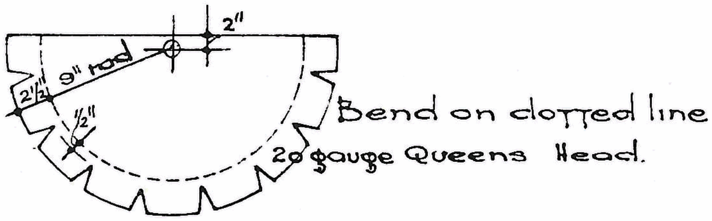
(3) Heavy gauge troughs are used for combined cattle and sheep watering, light gauge troughs for sheep.

TROUGH SIZES—

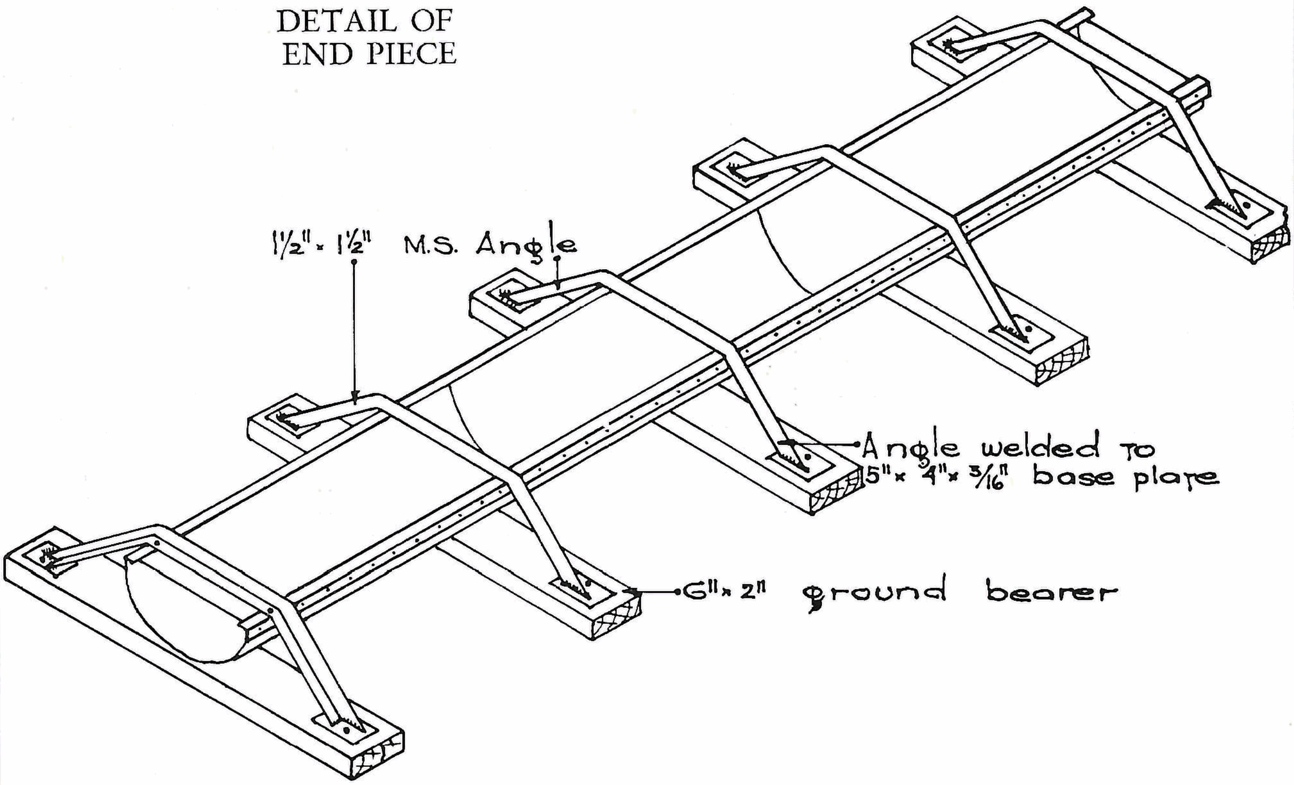
Item	Size 1	Size 2	Size 3	Size 4
Width of sheet used	24"	30"	36"	48"
Gauge	24. 22	22, 20	18, 16	16, 14
Width of trough ..	15"	18"	21"	30"
Depth of trough ..	8"	11"	11½"	15½"
Gals./ft. run	4	7.5	8.5	16

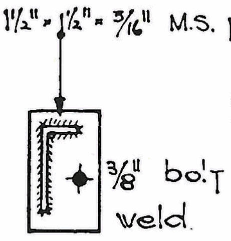
LYSAGHT
ORB
AUSTRALIA

SHEEP TROUGH, STEEL FRAMING

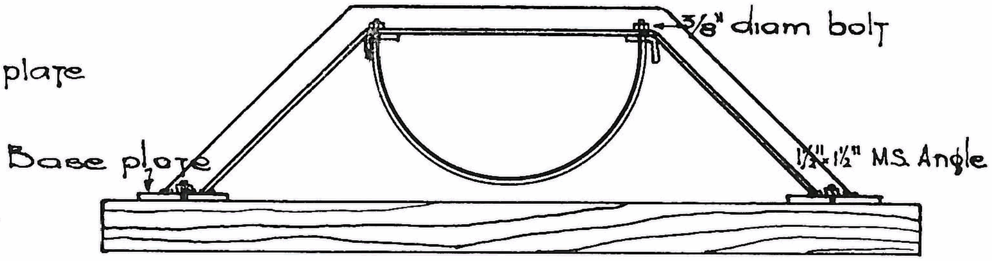


DETAIL OF END PIECE





DETAIL OF BASE PLATE



SECTION THROUGH TROUGH

SHEEP SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4267

SHEEP TROUGH, STEEL FRAMING

GENERAL.—Steel-framed galvanized sheet lined sheep watering troughs are commercially turned out in prefabricated units. Sheets 4264 and 4265 serve to illustrate types in common use. The construction can be rivetted and soldered as shown, or the design modified for use with felt insertion and clamped joints.

SIZE.—Established practice is to build troughs from Lysaght's Zincanneal or galvanized sheet. Dependent upon the sturdiness required, gauges of sheet used can vary from 14g. to 24g. (it is advisable to use heavy gauge sheets in the larger sizes). The range of capacities per foot run is controlled by the standard width sheets available, consequently four sizes are in common use, corresponding to 24", 30", 36", 48" wide sheets. Standard sheets are 6' to 8' long, and the troughing is generally supplied in multiples of this length.

At one time, it was common practice to have long, wide, deep troughs, but experience has shown that it is better to have a shorter and smaller trough with a full way float valve. Of the four sizes in common use, 15" x $7\frac{1}{2}$" and 18" x 10" are most applicable to country use. These sizes are more rigid than the larger ones, sheep cannot fall into the trough, and there is not much water standing to be consumed before fresh, clean water is available. It is a decided advantage to have alongside each length of trough a galvanized iron storage tank.

FRAMEWORK.—The framework is constructed of $1\frac{1}{2}$" x $1\frac{1}{2}$" angle iron supports bent to the shape as shown overleaf. To the legs of these supports are welded base plates, drilled with a $\frac{7}{16}$" hole. Supports are bolted to timber baulks with $\frac{3}{8}$" bolts. The trough is held to the supports by $\frac{3}{8}$" diameter bows threaded at each end. The supports carry $1\frac{1}{2}$" x $1\frac{1}{2}$" angle longitudinal side rails, to which is fastened the trough body.

TROUGH BODY.—The trough body is made from 24g. to 14g. galvanized sheets, according to the size of trough, as listed below. Sheets are fastened to the inside of the side rails with $\frac{1}{4}$" galvanized screws and washers. Adjacent sheets are lapped $1\frac{1}{2}$", rivetted with tinmen's rivets at 3" centres, and soldered. Serrated end pieces are cut as shown and flanged over. After flanging, the end piece is placed inside the curved sheet, rivetted at every second serration, and soldered to the trough body.

FOUNDATIONS.—The trough supports are carried on timber baulks, as shown, or alternatively, concrete slabs can be used. The baulks should be sunk into the ground so that the top of the baulks are at ground level. It is advisable to flag the area around the troughs with stones, and to drain the adjacent ground to keep the area of the trough well grounded.

FITTINGS.—The trough should be fitted with:—

Entry pipe and ball cock valve.
Ball cock valve cover.
Cleaning plug.

Ball cock valve covers can be purchased to fit all the size troughs mentioned below. Alternatively, these can be made from flat galvanized 14g. sheet, braced with flat iron brackets, or old oil and petrol drums.

NOTE.—(1) If the water is from a corrosive source, e.g., some bore waters, then it is advisable to paint the inside of the tank with a protective paint. A cement-linseed oil mix, sometimes used for coating the inside of water tanks, is suitable.

(2) Heavy gauge troughs are used for combined cattle and sheep watering, light gauge troughs for sheep.

TROUGH SIZES—

Item	Size 1	Size 2	Size 3	Size 4
Width of sheet ..	24"	30"	36"	48"
Gauge of sheet ..	24, 22	22, 20	18, 16	16, 14
Width of trough ..	15"	18"	21"	30"
Depth of trough ..	8"	11"	$11\frac{1}{2}$"	$15\frac{1}{2}$"
Gals./ft. run	4	7.5	8.5	16

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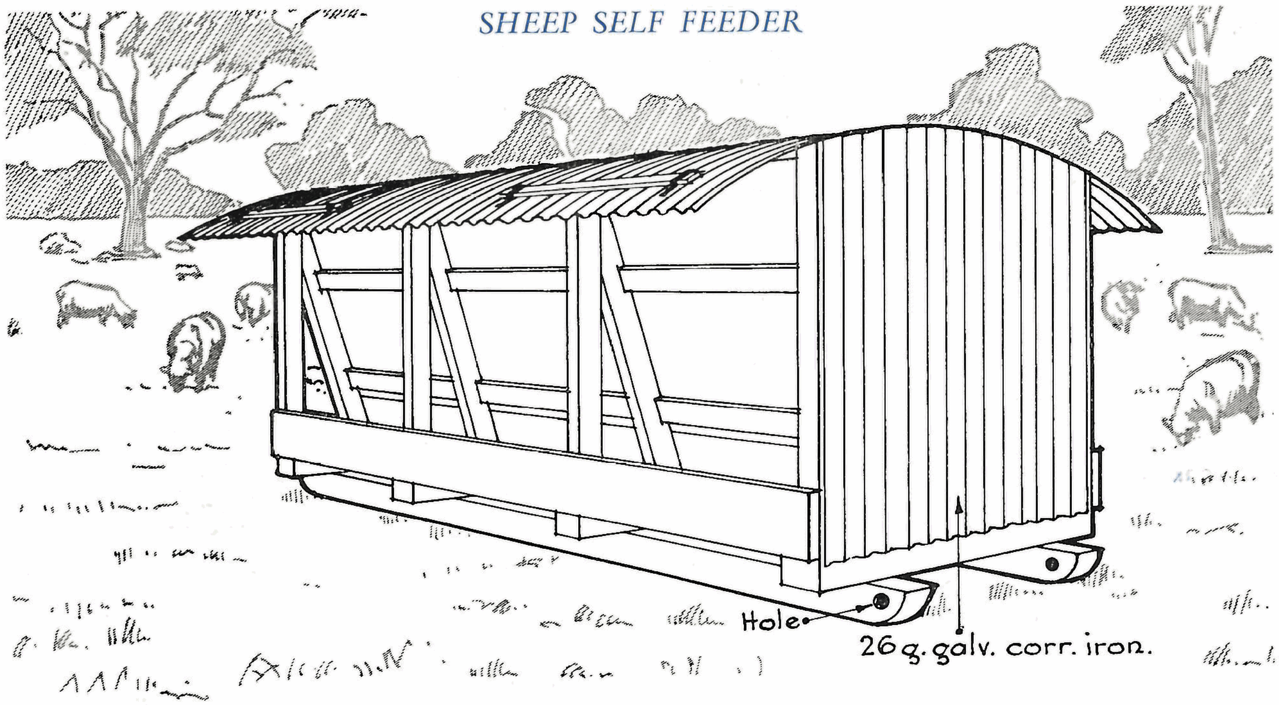
SHEEP SECTION

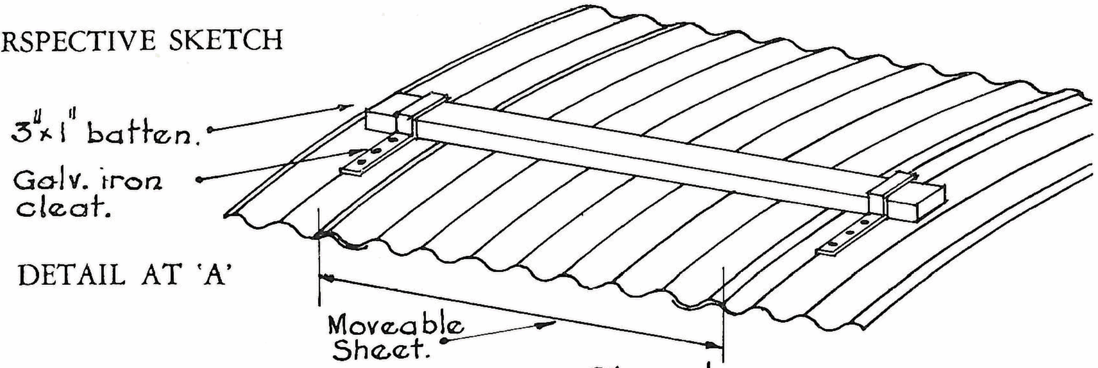
LYSAGHT'S COUNTRY SERVICE

SHEET 4272

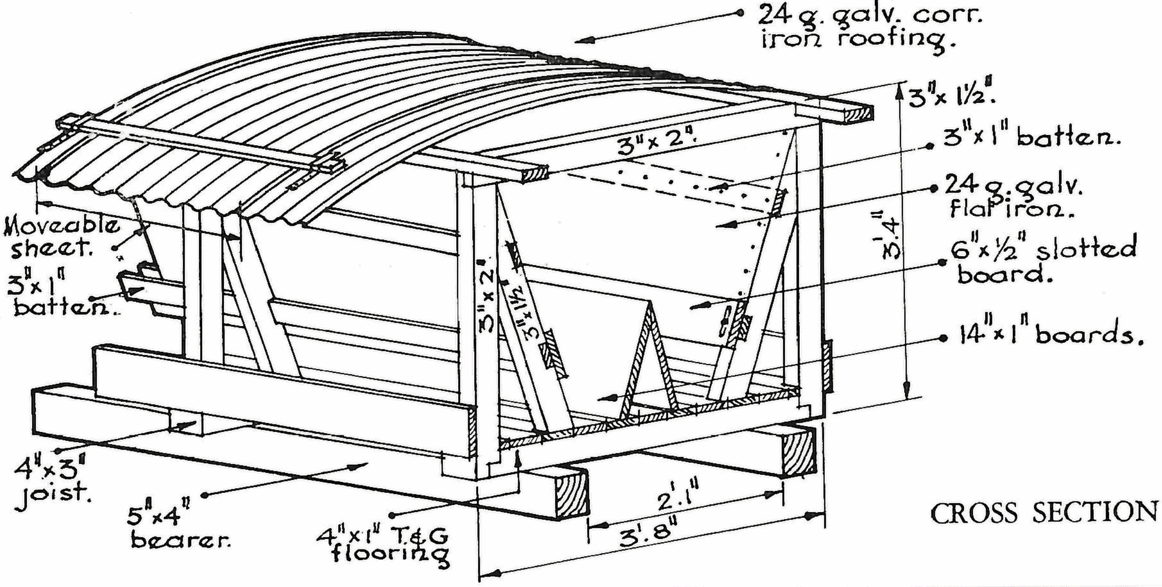
SHEEP SELF FEEDER



PERSPECTIVE SKETCH



DETAIL AT 'A'



CROSS SECTION

SHEEP SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4272

SHEEP SELF FEEDER—RECTANGULAR TYPE

GENERAL.—Self feeders are invaluable as a means of supplementary feeding. The elimination of daily feeding, by filling containers once in every four or five days, results in a marked economy of manpower. Various shapes and sizes exist—the framework can be of steel, timber, or a combination of both, but invariably the walls and roof of the structure are sheeted with Lysaght's corrugated and plain Zincanneal or galvanized steel sheet.

The rectangular, timber-framed type can be either mobile or fixed. Mobile feeders vary from prefabricated types that can be lifted by two or three men, to the larger types, which, as illustrated, are placed on skids for movement from paddock to paddock. Fixed types are almost identical in construction, but there is no limitation on length, this being built to requirements.

The type of feeder as illustrated holds about 5½ bushels per foot length of feeder, a convenient size being a 50-bushel container, which is 9' long.

FRAMEWORK.—Specifications for the timber used in framing need not be exacting, and roughly milled local hardwoods can be used throughout, framed together in sizes as shown overleaf. 6" x 4" or 5" x 4" bearers (or runners) are rounded at the ends to form skids, and holed to accommodate suitable towing gear.

Joists are 4" x 3", evenly spaced on the length of the feeder, but not to exceed 3' 0", bolted to bearers with ⅜" diameter timber bolts. Heads and nuts of bolts are to be fitted with square washers, and deeply countersunk.

Framework of joists and bearers is braced diagonally with 3" x 1" braces bolted to the underside of the joists (not shown in the sketch).

Superstructure is constructed as shown with 3" x 2" uprights, 3" x 1½" inclined struts, and 3" x 2" cross braces, all to be properly framed together and spiked or nailed. Cross braces carry 3" x 1½" longitudinal beams to take the roof, and the inclined struts carry 3" x 1" battens on which the siding is nailed.

In portable types, such as illustrated, bolts, and not nails, should be used wherever possible.

WALLS.—The side sheeting is carried on 3" x 1" battens, and in the example shown is 24 gauge galvanized flat sheet fixed with ¾" galvanized clouts. At the ends this is trimmed and battened into the corrugations of the vertical end sheeting.

ROOF.—The roof is of curved 5' lengths of Lysaght's 8/3" corrugations 24 gauge sheet steel, Zincanneal, or galvanized, lapped one corrugation. Sheets are fixed to 3" x 1½" longitudinal beams by roofing nails, 1 to every second corrugation. Every third sheet is loose (for five sheets in a 9' self-feeder, two sheets are loose). To this sheet is fixed 3" x 1" battens, which in turn slide into cleats on the fixed portion of the roof. Alternatively, loops can be rivetted or bolted on to both the fixed and movable portions of the roof, and a "keeper" of 3" x 1" timber run through the loops to hold the movable section in place. These loose sheets provide openings through which the grain is replenished.

FEED TRAY.—Feeding trays are completed by nailing on 6" x 1" longitudinal skirting pieces to each side, trimmed behind the vertical corrugated end sheeting.

At the lower end of the side sheeting is a gap, through which the grain flows into the feeding tray. The size of this opening, and hence the rate of feeding, can be set by the adjustment of a slotted regulating board. This board is clamped as required by a bolt, washer, and wing nut. Though shown here as a board, heavy gauge 16 gauge or 14 gauge galvanized flat sheet is most suitable, and much preferred by most builders.

The dividing V baffle wall is built in the centre of the grain-holding chamber to distribute the grain to both troughs. This can be built of 1" board as shown, or, as often happens, formed from a 30" wide 16 gauge galvanized flat sheet folded to size. This is generally more easily obtainable than 14" wide timber.

PAINTING.—If it is desired to paint the galvanized iron, this can be performed immediately by using metallic zinc dust paint. If oil paint is to be used, the surface should not be painted until the galvanized iron has weathered, that is, for a period of approximately six (6) months, after the iron has been out in the weather. The whole structure should be painted, two coats to woodwork.

LIST OF MATERIALS—50-BUSHEL FEEDER LENGTH, 9 FEET.

Material	Item	Size	Length	No.	Lin. ft.
Timber	Bearers	5" x 4"	10' 0"	2	20
	Joists	4" x 3"	3' 6"	4	14
	Uprights	3" x 2"	3' 4"	8	42
	Cross Braces	3" x 2"	3' 8"	4	
	Beams	3" x 1½"	9' 0"	2	42
	Struts	3" x 1½"	3' 0"	8	
	Battens	3" x 1"	9' 0"	6	67
	Keepers	3" x 1"	2' 6"	4	
	Diagonals	3" x 1"	3' 0"	3	
	Boards	14" x 1"	9' 3"	2	19
	Skirting	6" x 1"	9' 3"	2	19
	Slotted Boards	6" x 0½"	9' 0"	2	18
	T. & G. Flooring	4" x 1"	As available		100
Corrugated Galv. Iron	Roof	8-3" corr.	5'/24g.	5	
	End	8-3" corr.	7'/26g.	2	
Flat Q.H. Galv. Iron	Sides	6' x 36" x 24g.		4	
Hardware	As required				

The above quantities of timber are nett, and allowance must be made for wastage when ordering.

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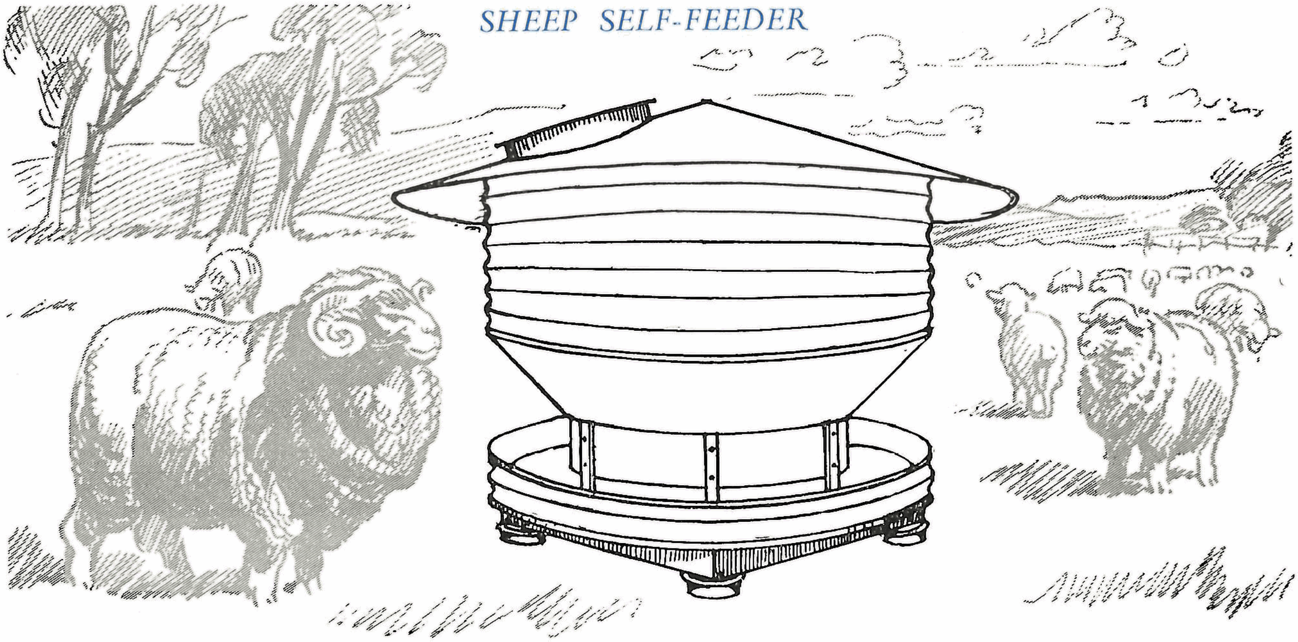
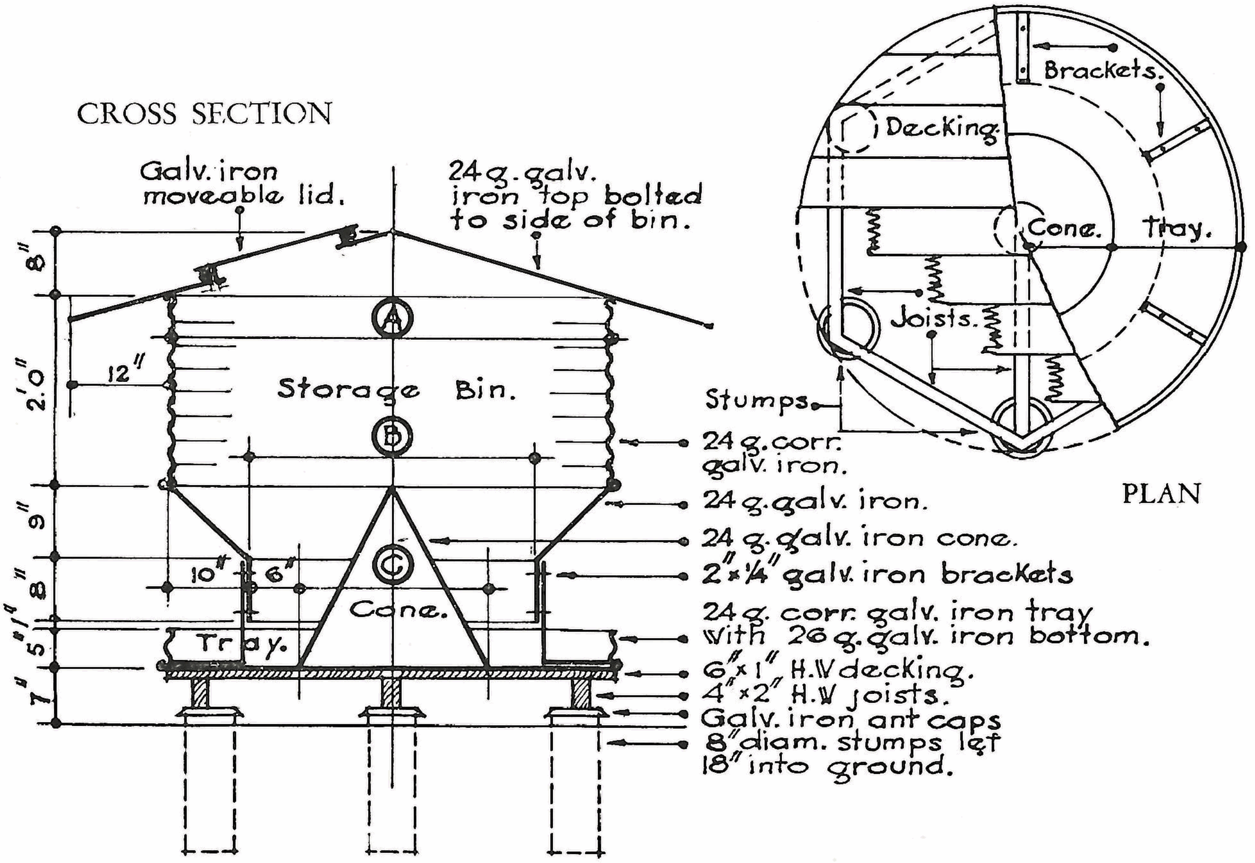
SHEEP SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4273

SHEEP SELF-FEEDER





CROSS SECTION

PLAN

SHEEP SELF FEEDERS—CIRCULAR

GENERAL.—Circular-shaped self-feeders, although more elaborate in design, and involving more time in construction than rectangular types, have many advantages. In relation to the quantity of grain held, they are economical in materials, light, and can be built up in any workshop in quantity and lifted to the site. The self-feeder illustrated overleaf is representative of the circular type.

FOUNDATIONS.—Foundations are to be constructed of stumps let about 18" into the ground. These can be 7"-9" local timber, preferably hardwood, or precast 6" square concrete stumps. Stumps are to be capped with 26g. galvanized iron ant caps projecting a minimum of $1\frac{1}{2}$" beyond the edge of the stump and turned down at an angle of 45°. All stumps are to be treated with creosote or other ant-deterrent preparation before setting in position. The excavation for stumps is to be back filled and thoroughly rammed.

PLATFORM.—The platform is to be of 1" decking, width dependent upon whatever is available locally, $\frac{3}{4}$" space to be allowed between planks when placing. Decking is to be double nailed to 4" x 2" hardwood joists, joists to be skew nailed to stumps. Circumferential joists are mitre-jointed and nailed to each other at intersections. All sawn timber to be twice coated with creosote before placing in position.

TRAY.—The tray is to be constructed of curved two-corrugations wide strips of 24g. corrugated galvanized iron, rivetted and soldered to a 26g. flat iron bottom, the whole to have a 24g. cone fixed centrally.

The circular bottom is cut from 6' x 3' or 8' x 3' 26g. "Queen's Head" galvanized flat sheets, lapped $1\frac{1}{2}$" and rivetted with tinmen's rivets at $2\frac{1}{2}$" centres. All joints and rivet heads are to be soldered. The tray is placed on the bottom sheeting and the circle for the bottom marked out, leaving 1" all round for turning up and flanging over the corrugated lip of the tray wall.

The tray wall is made by joining two curved strips of corrugated sheets. Each strip is made by cutting a full 8' x 3"-corrugation sheet, curved to the required diameter, into quarter-width pieces. These strips are lapped 4", rivetted with tank-making rivets and washers. Rivet heads and vertical joints are soldered. The top edge of the wall is seamed over to provide a smooth edge for feeding. The central cone of 24g. galvanized "Queen's Head" sheet, is lapped at joints and rivetted with tinmen's rivets at 3" spacing. The bottom of the cone is flanged and rivetted to the tray bottom. The bottom of the tray slopes very slightly from the centre to the edge, and small holes are to be punched in perimeter to allow the water to drain away.

STORAGE BIN.—The lower section of the storage bin is to be constructed of 24g. "Queen's Head" galvanized flat sheet, lapped, rivetted, and soldered, as required, the edge of the conical-shaped upper portion being flanged over the lip of the corrugated section of the storage bin. The corrugated section of the storage bin consists of complete sheets of 8-3" corrugations, 24g. Orb sheets, curved to the required diameter. The sheets are lapped and rivetted with tank-making rivets and washers. Joints need only be soldered, if it is expressly desired to do so.

SUPPORTING BRACKETS.—The storage bin is supported on 2" x $\frac{1}{4}$" galvanized iron brackets, each bracket being bolted to the lower section of the storage bin with two $\frac{1}{4}$" galvanized iron bolts and nuts. These brackets are similarly bolted through the tray to the decking and secured with $\frac{1}{4}$" diameter bolts, nuts, and washers.

ROOF.—The roof is to be constructed of 24g. galvanized iron, cut to size from 6' x 3' or 8' x 3' Lysaght's "Queen's Head" sheets, lapped $1\frac{1}{2}$" and rivetted with tinmen's rivets and washers. All joints are to be soldered after rivetting. Allowance is made in the roof for 12"-15" diameter filling hole. The upper sheet of the storage bin is flanged out in order that the roof can be joined to the bin with $\frac{1}{4}$" diameter bolts and nuts at 18" centres. The outside edge of the overhang is to be finished off with a rolled edge folded under.

PAINTING.—If it is desired to paint the galvanized iron, this can be performed immediately by use of metallic zinc dust paint. If oil paint is to be used, the surface should not be painted until the galvanized iron has weathered for a period of approximately six months after the iron has been exposed to the weather.

SIZES.—The diameter and size of the self-feeder is controlled largely by the fact that the bin is one ring of corrugated sheet high, and that complete sheets of corrugated iron are curved to form the storage bin. The sheets used are 6', 7', 8', 9', and 10' lengths, and a handy list of sizes are storage bins with perimeters of two 6' to 10' sheets, with 4" laps. These sizes and materials used are listed below.

LIST OF QUANTITIES

Item	Size 1	Size 2	Size 3	Size 4
Sheets to Storage Bin	2-7'	2-8'	2-9'	2-10'
Dimensions—A	4' 3"	4' 10"	5' 6"	6' 2"
B	2' 7"	3' 2"	3' 10"	4' 6"
C	1' 7"	2' 2"	2' 10"	3' 6"
Capacity: Cub. ft. ..	44	58	75	94
Bushels ..	36	48	62	78
Flat Sheets, 6' x 3':				
24g.—Roof, Lid, Storage Bin, Cone	4	6	8	8
26g.—Tray & Caps	1	2	2	3
Corrugated Sheets:	3	3	3	3
Storage Bin (2) ..				
Tray (1)	3/7'	3/8'	3/9'	3/10'
Timber:				
Stumps, 6"-8" x 1' 9"	7	7	7	7
Joists, 4" x 2" (linear feet) ..	14	20	24	28
Decking, 6" x 1" (linear feet) ..	32	44	52	66

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DAIRY SECTION

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FOREWORD

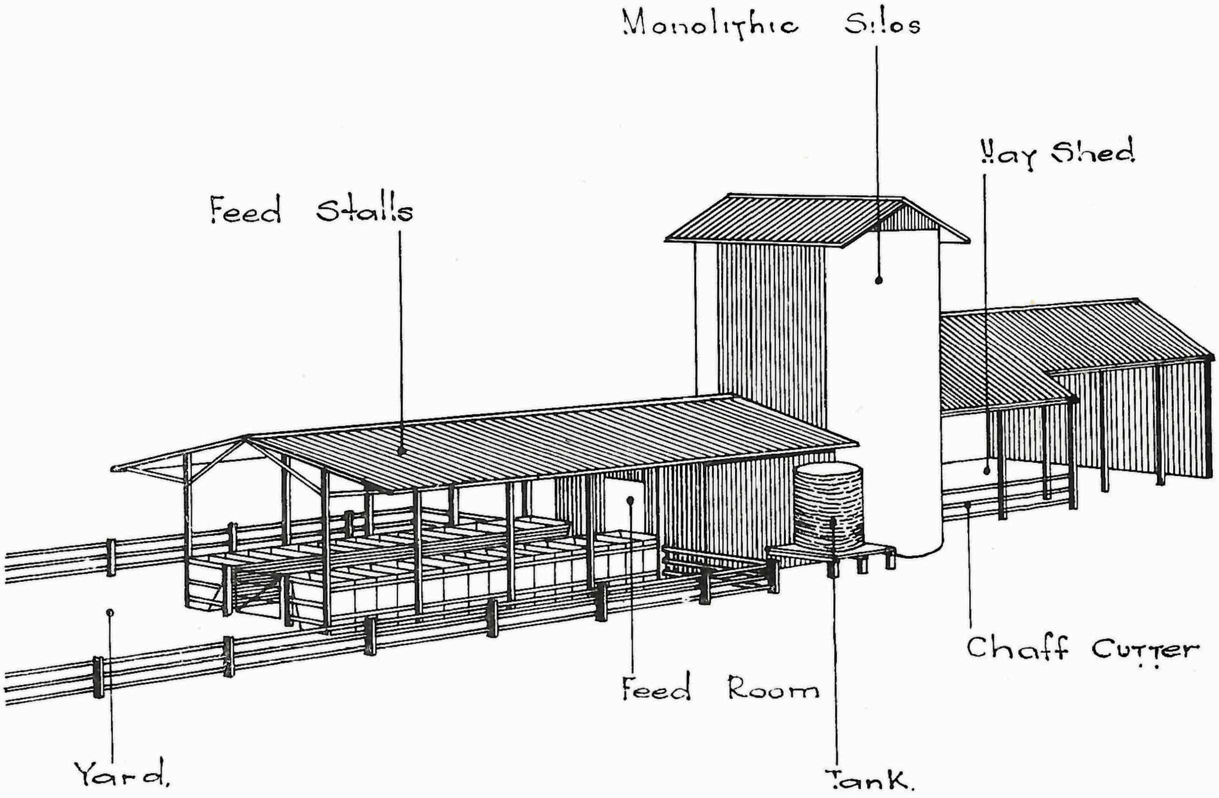
In every country, the progress of planned agricultural systems has involved changes in the function, design and construction of Farm Buildings. Statutory requirements for the housing and working of Dairy cattle and the standard of cleanliness for the treatment of milk and its products, are enforced by Government supervision in all States of the Commonwealth. The Regulations vary in each State, and it is, therefore, not possible for standardized construction to cover all the requirements of every State. Even within the borders of one State, regional weather dictates the type of buildings to be chosen. For example, it can be realised that wet and cold areas in the coastal belt vary considerably from the dry and warmer areas inland, and, in the latter, covered cattle yards are not necessary.

Climatic conditions are very important factors, and, of these, prevailing winds play the major part in all States. In the location and erection of bails and buildings, the farmer wants to protect his stock from the influence of bad weather (rain and wind). In addition, he should use to its fullest advantage the drying effect of the sun in the early morning. As a matter of convenience, we have attempted to abide by the Milk and Dairy Supervision Act, as laid down in N.S.W., where a Dairy Premise is defined as, "Any building, shed, land, or place used for stalling, grazing, feeding or milking of cattle, for the purpose of producing milk or cream to be sold for profit, or any building or place used for the deposit of cream or milk, when so produced."

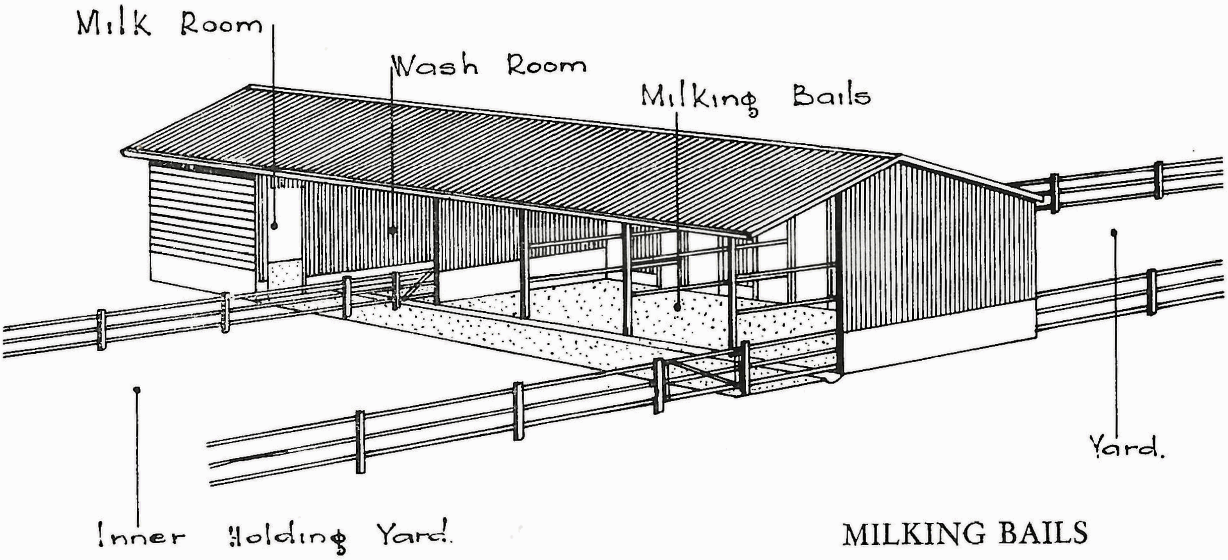
Whether the product of the dairy farm is milk for human consumption, or cream for conversion to other products, we present a comprehensive number of buildings, from which a selection can be made to suit the particular purpose. Cattle can be milked by hand or machine, and, in addition to describing both types of sheds, these sheets carry on with watering and feeding arrangements, together with the best means of fodder conservation. At all dairies, a milk room must be provided, whether the milk is stored or not. In the case of production of milk for human consumption, the milk room generally adjoins the dairy. Where the production is cream, separation can be carried out in a milk room, adjoining the bails, and the cream stored in a separate creamery. Alternatively, a milk-can room can be provided at the bails and separating and storage carried out in a "Separator and Cream Room." These sheets give suitable alternatives to suit any case.

No attempt has been made to describe combined feeding stalls and bails, as it is considered that, apart from a farmer's domestic needs, all dairy feeding should be done in separate feeding stalls. Exact details of construction are available in the various plans and pamphlets, prepared by the appropriate Departments of Agriculture or Milk Boards of the particular States. These, in the past, have been supplemented by suggested plans from the well-known Dairy Building Equipment Companies. It is our sincere belief that the recommendations on the layout, design and construction of dairy farm buildings will be invaluable to the farmer, builder, and architect. To this end, we have established an advisory service for the continuous study, selection of suitable dairy types, advice to the farmer, and the preparation of special data sheets and plans. You are invited to contact our Service Department on any problem that arises on the buildings of your dairy premises.

PERSPECTIVE VIEWS OF DAIRY



FEED STALLS AND
HAY SHED



MILKING BAILS

DAIRY PREMISES

GENERAL.—It is the purpose of this sheet to indicate factors affecting the layout of a suitable dairy, as pictorially presented overleaf.

In building these premises, it must be remembered that Government legislation has specifically laid down conditions associated with dairy premises, e.g., in N.S.W. the "Milk Act" and the "Dairies Supervision Act." Where this is so, and dairy premises are constructed by contract, it is desirable that the farmer should insert in the terms of the contract, a clause to the effect that the buildings are to be erected in accordance with the requirements of the Dairies Supervision Act, and to the satisfaction of an inspector authorised under the provisions of that Act. Approval must be obtained from the appropriate authority before building.

With a view to assisting and guiding dairy farmers in suitable layouts and structures, the various State Departments of Agriculture and Milk Boards have prepared plans and written material. Full advantage should be taken of this service. Data sheets, included in this manual, do not only conform to these principles, but amplify those section which deal with Lysaght's products. A standard plan will not suit all cases and all areas, but it is possible to indicate the essential items and to permit modification.

CLIMATIC INFLUENCES.—In wet periods, muddy yards are often a disturbing, contaminating factor, and, in dry periods, enhanced by winds, dusty yards are a problem. Both have an adverse influence on milk and cream products. In the construction of the yards, therefore, the farmer must give consideration to safeguarding against mud and dust, to drainage of the land, and the direction of the prevailing winds. He must set out his dairy buildings in such a manner that the contents of his separator and milk and cream store rooms are protected from any dust and bad odours which are likely to occur. For the same reason, consideration must be given to the location of calf pens, bull sheds, and any pig pens associated with the premises.

Dairy premises must not be situated within 30 yards of any thoroughfare, except in those cases where the road surface has been made of bitumen, concrete, or provided with other approved covering to control and eliminate dust.

MILKING SHED.—In siting the milking shed (bails), the farmer has to protect his stock from the influence of bad weather (rain and wind), at the same time using the sun to its full advantage, in keeping the respective areas dry and clean.

In N.S.W., protection is required from the afternoon summer sun, rain and cold, driving winds from the south or west, and hot summer winds from the west. Consequently, the entrance to the bails generally faces due north, with the gables of the shed running east and west. Bails so sited benefit from the cool north-east wind in summer and the maximum drying effect of the morning sun.

In Victoria and South Australia, the open side is generally to the north-east, while in Western Australia, where the weather comes from the west and north during the winter months, it will generally be found most suitable if the milking sheds face east and south.

MILK ROOM OR SEPARATOR ROOM.—Whether erected adjoining the bails or as a separate structure, one of the principal features to be provided is the most efficient system of ventilation. One of the conditions which is undesirable in the case of bails, is preferable in the case of milk rooms, i.e., the regulated utilisation of cold winds. In N.S.W., for example, by facing the gables of the milk room south, better ventilation is provided. Position of milk room in relation to the bails depends upon direction of prevailing winds. Milk and cream rooms must be lined, and ceilings follow the contour of the gable or hip roof. Flat or skillion roofs for milk and storage rooms should not be acceptable. Louvred gable end ventilation is recommended in all cases.

WATER SUPPLY.—For the proper cleaning of dairy premises, at milk room, bails, and feeding stalls, sufficient supplies of water are most necessary. Where possible, water from a bore, spring, or creek should be laid on to the dairy premises, so that a hose may be used. While creek or bore water may often be quite satisfactory for hosing down the general premises, the purest of water is preferable for cleaning of milk cans and milking apparatus. Established practice is to conserve, in galvanized iron storage tanks, the flow of water from the galvanized iron roofs of the various dairy buildings.

WASHING CONVENIENCES.—On all dairy premises, approved conveniences for heating water must be provided, and it is of first importance to have an adequate and quick means of supplying essential quantities of boiling water at 202°-212° Fahrenheit. Water heated by oil engines is not approved.

YARDS.—Approaches, gateways, and exits to sheds and yards should be properly firmed, metalled, paved, or preferably concreted, with external falls, and gutters cut to prevent accumulation of water or mud near the yard.

FEEDING STALLS.—Though composite milking bails and feed stalls are built in certain areas, it is, in fact, laid down for certain milk zones that cows be fed away from the bails. Feed stalls are to be constructed over concrete floors, properly graded and drained to carry away all washings, as required, similar to milking shed construction. The concrete floor should extend to a distance of 4' beyond the drain at the rear of the cows, and this extension should slope towards the drain. Feed stalls should not be situated closer than 40' to the milking bails. Stalls may be ranged on each side of a feed alley, and a trolley line can be laid down to carry the supplies of fodder from a feed room and mixing board to the feeding troughs. The feeding stall should be separated from the feed room by a passage 6' wide.

CONSERVATION OF FODDER — SILOS.—The conservation of fodder, especially in such a cheap and safe form as ensilage, should receive the most careful attention. Without the provision of silos and feeding stalls of the best types, milking sheds and separator or milk room, though of the highest standard of construction, cannot be put to their fullest use. Plans showing the general construction of silos are described in other data sheets.

BULL SHED.—The erection of a bull shed and the provision of a separate bull paddock involve a principle of great importance. Farmers know the value of a good bull, and the importance of looking after him properly. For proper care, a bull shed is indispensable.

CALF PENS.—When calves are kept, especially where the farmer is systematically building up a good herd, it is important that proper provision be made for housing and feeding the young stock.

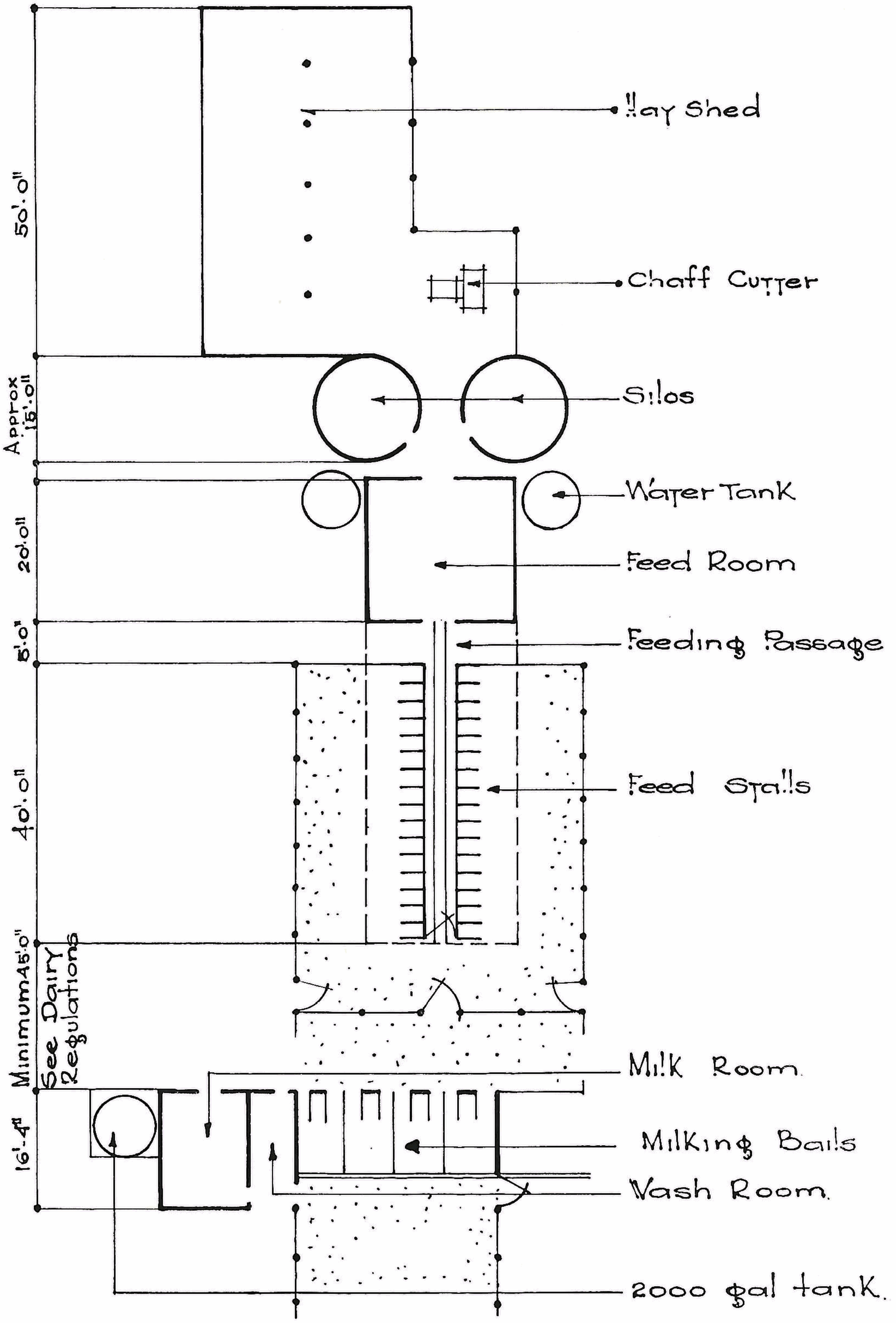
WATERING.—In the paddock, cattle should have, at all times, access to an ample supply of good, pure water. Cattle troughs are invariably made from galvanized steel sheet, fitted to the necessary steel or timber framework, and equipped with the necessary fittings for replenishing and emptying the troughs.

DAIRY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4313B

DAIRY PREMISES — PLAN.



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DAIRY PREMISES — PLAN.

GENERAL.— This Sheet depicts in plan the dairy premises, illustrated in Sheet 4313A, and should be read in conjunction with that Sheet. In considering this plan, it must be remembered that the feed stalls must not be closer to the bails than the distance laid down by the dairy regulations of the State concerned. Premises should not be situated within 30 yards of any thoroughfare, except in those cases where the road surface has been made of bitumen, concrete, or suitably sealed.

Planning of the premises should be such that the circulation of the people and animals using the dairy premises should be easy. In a suitable layout, one expects to find as a minimum:—

Receiving and Bail Yards.
Milking Bails.
Milk and Wash Room.
Feeding Stalls, associated with a Feed (or Concentrates) Room.
Associate Yards and watering requisites.

In a holding of any size, other structures are imperative, for example:—

Concrete Silos.
Hay Shed.
Calf Pens.
Bull Pens.

Later sheets discuss these in more detail, but in considering premises as an entity, the summary of information contained in the paragraphs below will assist in general planning.

MILKING SHEDS.— Milking sheds are dealt with later in this section in special sheets, but, in general, the dimensions of the bails are:—

Width.—Single headlock bails or half crush type, 5' 0".
Double machine type, 7' 0", permitting of crushes each 4' x 2' 4".

Length of division rails from wall to drain should be 10' 0", and the overall width of the shed, including overhang, varies from 16' to 18'.

All walls are to be 8' from the highest point in the floor to the top of the top plate.

A wide, shallow, dish-type drain should be provided at the entrance to the bails, immediately behind the bail back posts.

MILK ROOM.— On all dairy premises, a milk room must be provided, whether milk is stored or not. The position of the milk room depends upon the direction of the prevailing winds. Dependent on whether milk is being produced for human consumption or conversion to other products, so:

(1) If the milk is being despatched to a central plant for sale as milk or extraction of cream, then the dairy owner has a milk room, either adjoining the bails or a separate milk and wash room detached from the bails.

(2) If separation is carried out on the premises, then again, the owner can have a milk room, separating plant, and cream storage adjoining the bails, or he can have a separate structure placed some distance away, combining the functions of separating, cream storage, and wash-up.

A suitable type of detached structure is illustrated in a special sheet of this brochure. The minimum size of building, where used separately or in combination as a room for separating, storage, cream or butter making purposes, must be as follows:—

20 cows or more ..	10' x 12' x 10' plus wash room
10-20 cows	10' x 8' x 10' plus wash room
10 cows and under ..	8' x 7' x 7' plus wash room

The wash room is to be the same width as the milk room, but to be a minimum of 6' in depth.

Where separate premises are required for butter making and/or cream storage purposes (for example, in cases where the milk room is adjoining the bails, the minimum size for any herd must be 8' high x 7' x 7'.

Where a separate room for the storage of cream is provided it must be situated at least 30' away from the bails and cow yards, and be not less than 7' x 7' x 8' high.

Summary of Distances of Separator, Cream Storage Room, and Bails from Contaminating Influences

	Dairy, Cream Storage or Butter-making Yards	Bail Yards
Dwelling—Farm	20	20
Town	25	15
Road—Farm	30	30
Town	20	20
Manure heaps	30	30
Bails	10	—
Bull houses	40	40
Calf pens and feeding place	40	40
Pig pens and stables	50	50
Straying poultry and animals	5	—
Stock feed stalls combined with bails ..	10	—
Stock feed stalls separate from bails ..	15	15
Silos	30	10
Feed room as per plan (see Fig. 8) ..	20	2
Curd and casein plants	50	50
Pan system privies—Farm	50	50
Town	10	10

FEEDING STALLS.— The most practical form of feeding stall is the design illustrated in Sheet 4342, an open-side structure cantilevered over the area where the cows are standing while feeding. Supporting posts (for the roof framework) are 10' apart, and the distance between is divided into four equal portions (2' 6" each), each portion forming a manger. The overall width of the structure is approximately 22', height under the eaves 6' 6" minimum, and the length is dependent on the number of cows being milked. Allowing for a fence running parallel to the stalls, an overall width of 40' should be allowed between fences.

FEED (OR CONCENTRATES) ROOM.— The height of this building depends upon the amount of feed to be held, but, where practicable, for ease of erection and continuity of flow of feed, this should be a continuation of the feeding stalls. It is admitted that this gives very low eaves, but some may prefer to sacrifice ease of construction to build a feed room with eaves 10' high. By using skylights/, bags of feed may be stacked as high as the eaves.

SILOS.— The diameter and height of the silo will depend upon the number of animals to be fed, and the number of days during which the feeding of ensilage occurs. Internal diameters vary from 10'-18', and heights of 25'-40'. The size in most common use is about 14' in diameter and 28' high.

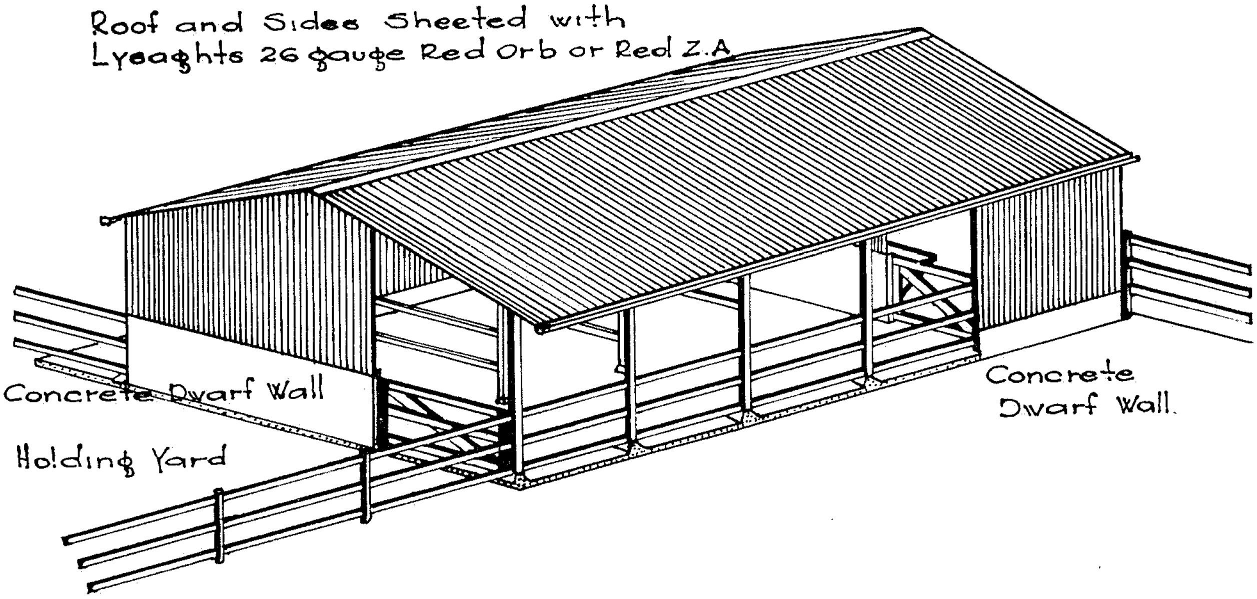
HAY SHED, CHAFFCUTTER, ETC.— The hay shed associated with dairies is generally of different construction to those associated with sheep holdings and wheat farms where the rainfall is relatively low, and the shed is opened on all sides, allowing the bays of the building to be stacked, generally in baled lots of various quality.

The dairy hay shed is quite often in a district where not only heavy but driving rains are experienced. The hay shed is invariably enclosed on the weather side.

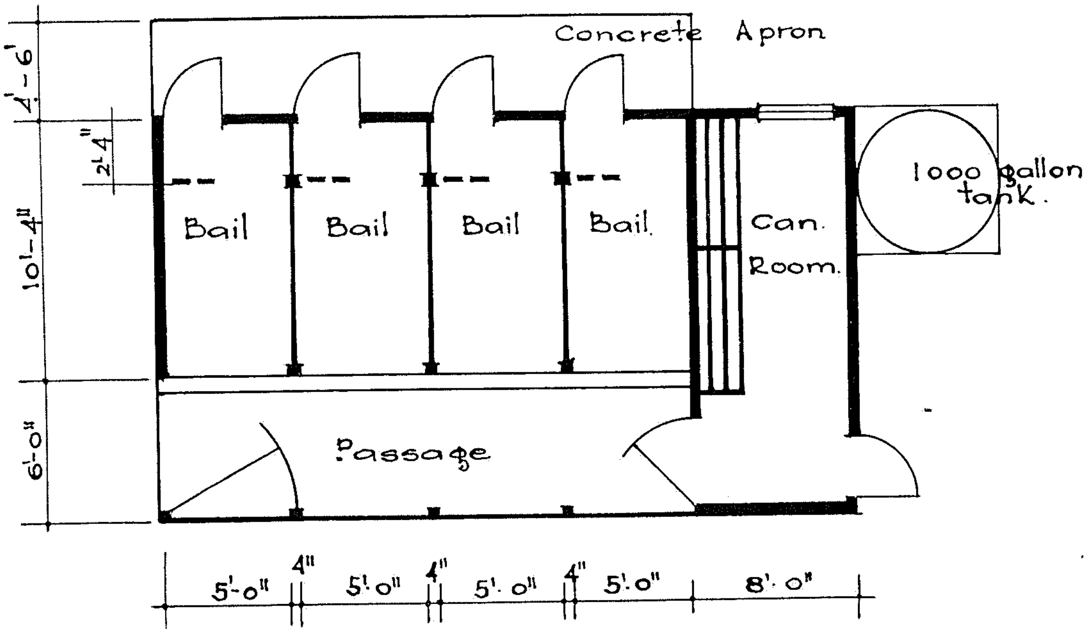
Associated with the silo and hay shed is a chaff-cutting shed and elevator chute for feeding the cut silage into the silos.

BULL SHEDS—CALF PENS.— No attempt has been made to position these on the general layout overleaf, as they are generally located at some distance from the general milking and feeding set-up.

SINGLE BAILS — HAND-MILKING TYPE


Roof and Sides Sheeted with
Lysaghts 26 gauge Red Orb or Red Z.A
Concrete Dwarf Wall
Holding Yard
Concrete
Dwarf Wall.

ISOMETRIC VIEW



PLAN

DAIRY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4322

SINGLE BAILS — HAND-MILKING TYPE

GENERAL.—On all dairy premises a milking shed is to be provided in which all milking must be done. This milking shed must occupy a well-drained position, and be so situated that good sanitation can be permanently obtained. When erected on a slope, the shed must be above the yards, in order that rain will not sweep yard refuse into the bails.

Mill-sawn timber should be used for preference in the construction of the milking shed and bails. Many farmers, due to the availability of local hardwood and cypress pine, prefer to use round or axed timber. This can be used at the discretion of the local supervisory authority. The shed, illustrated overleaf, is of the single headlock bails or half crush type, the width of bails being 5'.

FLOORS AND DRAINS.—The floors must be of 5:3:1 concrete, at least 4" thick, cement rendered and graded 1" in 12' to the rear of the cow bails, so that the washings may be easily and rapidly drained away into a shallow dished type drain immediately behind the bail back posts. Where the site is on relatively level ground, and the requisite fall, namely, 1" in 12', is not naturally available, the foundations of the bails are to be raised to obtain the necessary fall. The drain must be constructed of concrete, steel trowelled and graded, so that the washings can be drained away at least 45' from any section of the dairy premises and yards.

DWARF WALLS.—Under all stud walls, concrete dwarf walls 4" thick are to be provided. Wall framing for the ends of the bails and dividing wall between wash room and bails is to be fixed to a concrete wall of a minimum height of 3' above floor level. All other dwarf walls to be at least 12" in height. All intersections of concrete walls with the floor should be coved to avoid accumulation of dirt at the angles. Bolts used to fasten plates to the concrete dwarf walls must be embedded in the concrete to a depth of not less than 3".

POSTS.—Posts are to be 4" x 4" sawn timber, set on concrete blocks 6" above the level of the floor and fixed to them by a steel rod dowel. These dowels should be set at a depth of 3" below the floor surface. All intersections of blocks with the floor should be coved to avoid accumulation of dirt at the angles.

WALL FRAMING.—All walls are to be a minimum of 8' high from the highest point in floor to top of roof plate.

Walls are framed up in:—

Corner and door studs	4" x 4"
Intermediate studs at 2' 0"—2' 6" centres	4" x 2"
Top and bottom plates	4" x 2"
Girts checked into studs	3" x 1"

ROOF FRAMING.—The roof is framed up in:—

Rafters	4" x 2"
Battens	3" x 1"
Ridge board	6" x 1"

Rafters are bird's-mouthed over and strapped to the wall plates with 1" galvanized strapping.

ROOFING.—The roof is to be sheeted with 10' lengths of 26g. 10 x 3" corrugations Red Orb or Red Zincanneal sheeting, applied with a side lap of one and a half corrugations. Sheets are secured to battens with spring-headed roofing nails, pierced through the top of every second corrugation at ends of sheets and every third corrugation at intermediate battens.

Finish off at gables with rolled edge.

WALL SHEETING.—Rear and side walls are sheeted with 7' lengths of 26g. Red Orb or Red Zincanneal, 10 x 3" corrugations.

Sheets are cut and lapped to fit gable ends as required. Sheets are to be side-lapped one corrugation and end-lapped a minimum of 4", to be fixed with spring-headed roofing nails through the top of every second corrugation at end points and every fourth corrugation at intermediate points.

RIDGE CAPPING.—Ridge capping is to be formed from 18" wide strips of 24g. Queen's Head galvanized iron or Zincanneal R.L. sheet, in 6' or 8' lengths. Ridging is lapped a minimum of 6" at the joints and securely fixed in position in conjunction with roofing sheets.

EAVES GUTTERS.—Eaves gutters are to be 4½" beaded-edge quadrant type, formed from 24g. Queen's Head galvanized iron or Zincanneal R.L. in 6' or 8' lengths. These are fixed in position with required falls to outlets, lapped, double riveted, soldered at joints, and secured to rafters with 16g. galvanized brackets. Gutters are cut to receive thimble connections of downpipes and properly soldered and wiped at these junctions. Provide galvanized wire gratings at all downpipe outlets.

DOWNPIPES.—Provide and fix 24g. 3" dia. downpipes of Queen's Head galvanized sheet or Zincanneal R.L., formed in 6' and 8' lengths. Water is carried away to storage or rubble drains as required.

BAIL EXIT.—The exit end of the bails is to be provided with a concrete apron 4' wide, extending over the length of the building. The area immediately in front of this concrete apron is to be paved, metalled, or concreted for a distance of 15'. Where the formation of the ground is such that the slope is towards the bail exit, the paved area should be joined to the concrete apron at least 3" below its surface to form a channel, in order that storm water may not enter the bails.

BAIL DIVISIONS.—Bail divisions are framed up in dressed timber, round hardwood, or cypress pine. In this design, 6" x 1" timber rails are checked into 4" x 4" posts.

BAIL HEADS.—Where timber is used, bail heads are made from 4" x 2" timbers, shaped, dressed and jointed to detail, all bail sticks being carried longitudinally through the shed by two 3" x 1½" rails, set a minimum height of 4' 6" clear from floor. If pipes are used for bail divisions, then bailing chains are used rather than bail heads.

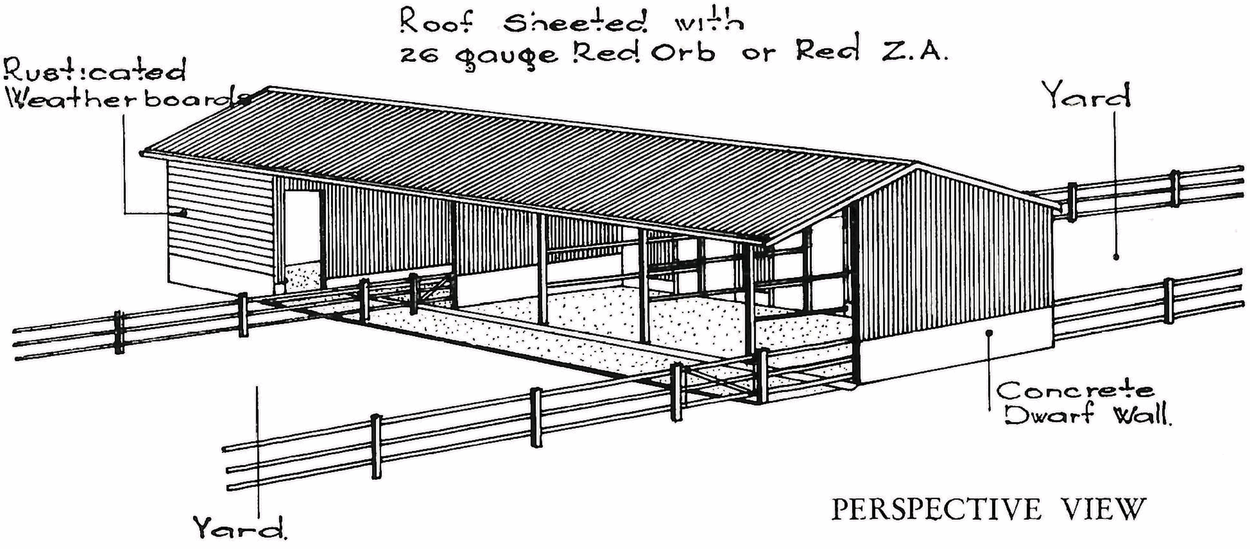
CAN ROOM.—Where the separator and milk room is some distance from the bails, a temporary can room is often provided adjacent to the milking bails. This is of similar construction to the remainder of the shed, but is fitted up with a rack of galvanized iron pipe, on which to stand the milk cans.

BAIL PUSH ROD.—The bail push rod mechanism is generally carried by 3" x 1½" timber-framed bracket suspended from the ceiling. The ends of the rods handled by milkers, if of timber, should be covered with galvanized flat sheet to facilitate cleaning.

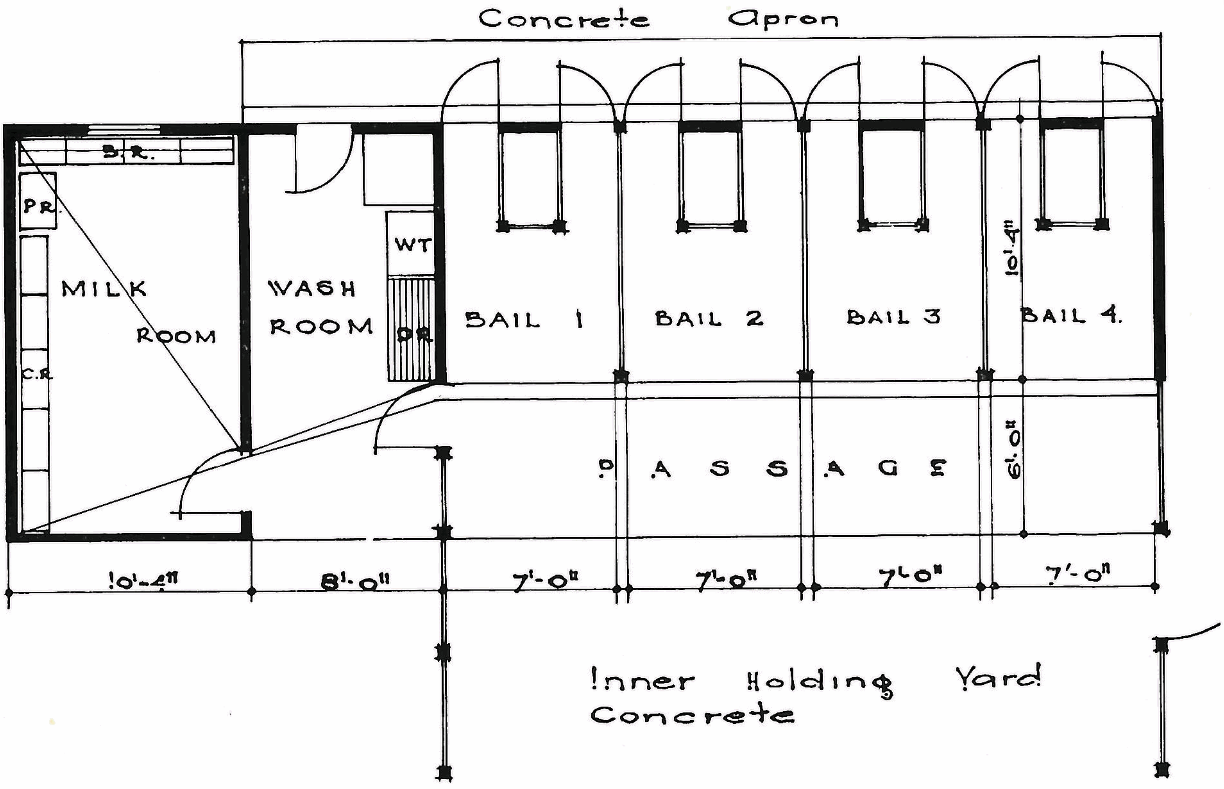
BAIL DOORS.—Doors are to be 5' x 2' 4", framed up with 5" x 1½" timbers and sheeted with 5' sheets of 10 x 3" corrugations 26g. Red Orb or Red Zincanneal sheet. Each door is to be hung with two 12" heavy T. hinges.

PAINTING.—All timber, both inside and outside the building, is to be painted with oil paint.

DOUBLE BAILS -- MILKING — TYPE A.



PERSPECTIVE VIEW



PLAN

DAIRY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4324

DOUBLE BAILS — MILKING — TYPE A.

GENERAL.— The Milking Shed plays a most important part in dairy farming, and the progressive dairy farmer recognizes that a well-planned and properly equipped shed materially assists in the production of the finest quality milk and cream. The shed illustrated overleaf is suitable for machine milking eight cows simultaneously.

FLOORS AND DRAINS.— The floors and drains are of 4:2:1 mix concrete at least 4" thick, cement rendered and graded to provide a fall into a shallow dished type drain immediately behind the bail back posts. This fall is to be at least 1" in 5' (1 in 60). Where the site is on relatively level ground and the requisite fall is not available, the foundations of the shed are to be raised. The drain is to extend a minimum of 45' away from the dairy premises and yard.

DWARF WALLS.— Under stud walls, concrete dwarf walls 4" thick are to be provided. Dwarf walls at the ends of the bails are to be at least 3' in height, all others to be at least 12" high. Bolts used to fasten plates to the concrete walls are to be $\frac{3}{8}$" dia. split bolts, embedded in the concrete to a depth of not less than 3".

PAVING.— Paving is required outside the bail exit doors (with shallow drains against the wall) to a minimum width of 4' 0". Similarly, with end entrance sheds an end entrance concrete apron 6' x 6' is required.

POSTS.— Posts are to be 4" x 4" sawn timber, set on concrete blocks 6" above the level of the floor, and fixed to these blocks with steel straps and split bolts set in concrete.

WALLS.— All walls are to be a minimum of 8' 0" from highest point of floor to top of roof plate, and framed up in:—

Corner and door studs	4" x 4"
Intermediate studs at 2' 0" centres ..	4" x 2"
Top and bottom plates	4" x 2"
Girts checked into studs	3" x 1"
Noggings for milk room	4" x 2"

Bottom plates are fixed to $\frac{3}{8}$" split bolts set in concrete.

ROOF FRAMING.— The roof of the structure is of gable type construction. Frame up roof in:—

Rafters at a maximum spacing of 3' ..	4" x 2"
Battens, maximum spacing 4'	3" x 1"
Ties	4" x 2"
Ridge board	6" x 1"

At the entry to the bails the roof is supported on a 5" x 2" roof plate fixed to the ends of 6" x 2" tie beams supported on bail posts and cantilevered out 6' 0".

ROOFING.— The roof of the structure is to be sheeted with 10' lengths of 26g. 10 x 3" corrugations Red Orb or Red Zincanneal sheet, fixed with a side lap of $1\frac{1}{2}$ corrugations. Sheets are secured to battens with spring-headed roofing nails, pierced through the top of every second corrugation at ends, and every fourth corrugation at intermediate points.

WALL SHEETING.— With the exception of the milk room, rear and side walls are sheeted with 7' lengths of 26g. Red Orb or Red Zincanneal 10 x 3" corrugations. Sheets are cut and lapped to fit gable ends as required. Sheets are to be side lapped one corrugation, end lapped a minimum of 4", and to be fixed with spring-headed roofing nails through the top of every second corrugation at end points and every fourth corrugation at intermediate points.

Where Dairy Regulations permit the use of galvanized iron for the walls of the milk room, then sheet the sides similarly to the bails.

Where Dairy Regulations stipulate brickwork or timber sheeting for milk rooms, then, as illustrated, a suitable sheeting is weatherboard fixed on to the vertical 4" x 2" studding, complete with corner moulds, the bottom weatherboards being splayed out to form a suitable bell-cast ventilating panel some 12" above the ground level.

RIDGE CAPPING.— Ridge capping is to be of standard section formed from 18" wide strips of 23g. "Queen's Head" galvanized iron or Zincanneal sheet in 6' or 8' lengths. Ridging is lapped a minimum of 6" at the joints and securely fixed in position in conjunction with the roofing sheets.

EAVES GUTTERS.— Eaves gutters are to be $4\frac{1}{2}$" beaded-edge quadrant type, formed from 24g. "Queen's Head" galvanized sheet or Zincanneal in 6' or 8' lengths. These are fixed in position with required falls to outlets, lapped, double riveted, soldered at joints, and secured to rafters with 16g. galvanized brackets.

DOWNPIPES.— Provide and fix 3" diameter downpiping of 24g. "Queen's Head" galvanized sheet or Zincanneal sheet formed in 6' and 8' lengths. Water is carried away to storage in approved positions with combined capacity of at least 2,000 gallons.

LINING.— The milk room must be lined on the four inside walls and the ceiling to follow the roof contour on the underside of rafters to collar ties at about one-half the roof height and not less than 10' above the floor. 24g. "Queen's Head" or Zincanneal sheet, either plain or V-crimp, is recommended for this purpose, nailed to studs with $\frac{3}{4}$" galvanized clouts.

VENTILATION.— In timber-frame walls, ventilation is provided on at least two sides of the milk room by a 6" ventilating panel 12" above the ground. This is covered with rust-proof fly wire. Upper ventilation is to be by louvred ventilators, each at least 2' x 18", set in gable end walls to ventilate above and below ceilings. All ventilators should be fly-proofed with rust-proof fly wire placed behind the louvres.

DOORS.— Bail exit doors are to be 5' x 2' 4", framed up with 5" x $1\frac{1}{2}$" timbers and sheeted with 5' lengths of 26g. 10 x 3" corrugations Red Orb or Red Zincanneal sheet. Each door is to be hung with two 9" heavy T hinges, and suitably fitted with door-operating mechanism. A self-closing fly-proof door is provided to the milk room. Provide a 6' 6" x 2' 4" door to the engine room.

WINDOWS.— A glazed window is to be provided in the milk room with a total area equivalent to 1/10th of the floor area—4' x 2' 6" is a suitable size for the building shown. If the window is placed in a northern or western wall an external hood is to be provided.

BAIL CONSTRUCTION.—Use of the suspended crush is recommended in all cases for machine type bails, whether constructed of hardwood or tubular metal. The 7' width of milking bails allows of crushes each 4' x 2' 4", framed up in 3" x 2" members. Each double bail is separated from the adjacent group by division posts and rail fences formed of 6" x 1" dia. rails checked into 4" x 4" posts and wall studs.

Bailing is carried out by chains attached to the division walls and suspended on the bail heads.

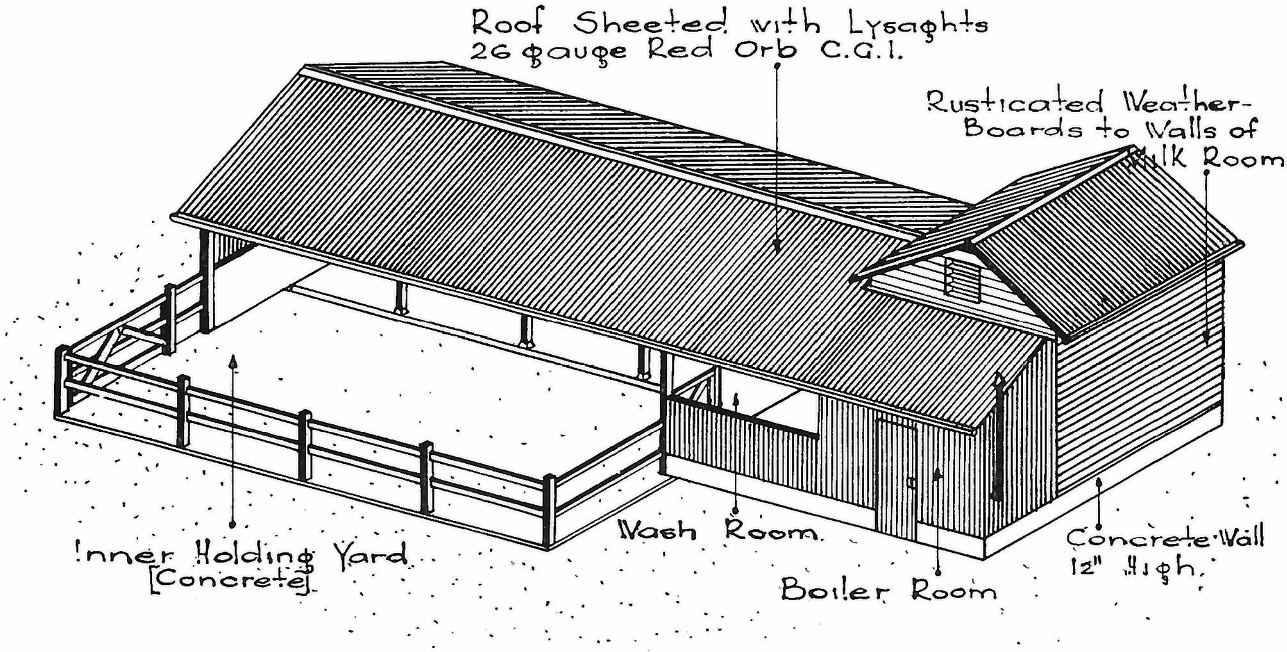
WASHING FACILITIES.— Facilities for the supply of adequate quantities of boiling water and/or steam under pressure must be installed. These are fitted to the owner's requirements.

RACKS.— Racks are to be provided in the milk room for the storage of empty milk cans, buckets, separator parts, and other utilities after the same have been thoroughly washed and scalded. Similarly, wash troughs and drainers are installed in the wash room. The racks, shelves, and wash-up trough should be without legs, each being braced back to the wall and allowing of easy cleaning of the floor.

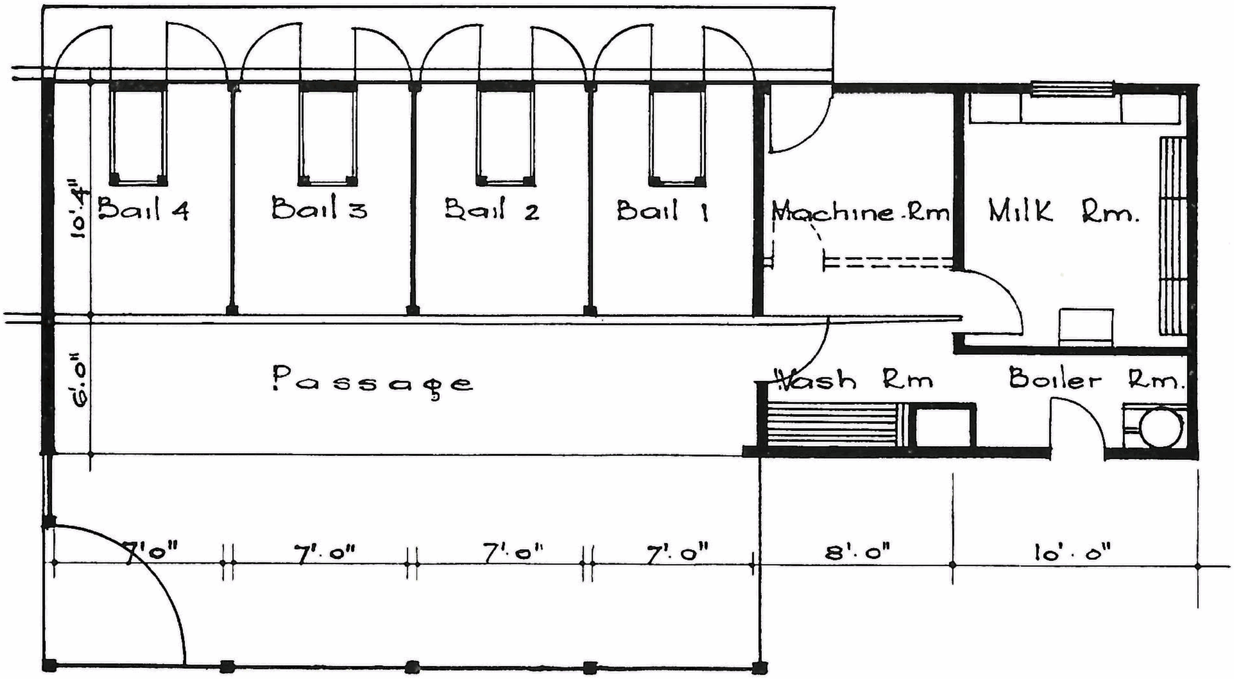
PAINT.— All timber, both inside and outside the building, to be painted with oil paint.

NOTE.— Before construction commences on any milking bail structure, the plan should be submitted to the appropriate authority for approval, e.g., the Milk Board in N.S.W.

DOUBLE BAILS — MACHINE MILKING — TYPE B.


Roof Sheeted with Lysaghts 26 gauge Red Orb C.G.I.
Rusticated Weather-Boards to Walls of Milk Room
Inner Holding Yard [Concrete]
Wash Room.
Boiler Room
Concrete Wall 12" High.

ISOMETRIC VIEW



PLAN

DAIRY SECTION

LYSAGHT'S
COUNTRY SERVICE

SHEET 4325

DOUBLE BAILS -- MACHINE MILKING — TYPE B.

GENERAL.—The Milking Shed plays a most important part in dairy farming, and the progressive dairy farmer recognizes that a well-planned and properly equipped shed materially assists in the production of the finest quality milk and cream. The shed illustrated overleaf is suitable for machine milking eight cows simultaneously.

FLOORS AND DRAINS.—The floors and drains are of 4:2:1 mix concrete at least 4" thick, cement rendered and graded to provide a fall into a shallow dished type drain immediately behind rear posts of the bails. This fall is to be at least 1" in 5' (1 in 60). Where the site is on relatively level ground, and the requisite fall is not available, the foundations of the shed are to be raised. The drain is to extend a minimum of 45' away from the dairy premises and yard.

DWARF WALLS.—Under stud walls, concrete dwarf walls 4" thick are to be provided. Dwarf walls at the ends of the bails are to be at least 3' in height, all others to be at least 12" high. Bolts used to fasten plates to the concrete walls are to be $\frac{3}{8}$" dia. split bolts, embedded in the concrete to a depth of not less than 3".

PAVING.—Outside the bail exit doors, concrete paving is laid down to a minimum width of 4' 0", and a shallow drain formed against the wall. Similarly, a 6' x 6' concrete apron is required at the entrance to the bails.

POSTS.—Posts are to be 4" x 4" sawn timber, set on concrete blocks 6" above the level of the floor, and fixed to these blocks with steel straps and split bolts set in concrete. Posts for double machine type sheds are at 7' centres.

WALLS.—All walls are to be a minimum of 8' 0" from highest point in floor to top of top plate, and framed up in:—

Corner and door studs	4" x 4"
Intermediate studs at 2' to 2' 6" centres	4" x 2"
Top and bottom plates	4" x 2"
Girts checked into studs	3" x 1"
Noggings for milk room	4" x 2"

Bottom plates are fixed to $\frac{3}{8}$" split bolts set in concrete.

ROOF FRAMING.—The roof of both bails and milk room are of gable type construction, with the roof of the separator room at right angles to the roof of the bails. Frame up roof in:—

Rafters, at a maximum spacing of 3'	4" x 2"
Battens, maximum spacing 4'	3" x $1\frac{1}{4}$"
Ties	4" x 2"
Ridge board	6" x 1"

Provide and fix 6" x 2" tie beams across bail posts to cantilever 6' over passage. A roof plate of 5" x 2" hardwood is fixed to ends of cantilever to form a support for the roof. Rafters of washroom annexe are suitably cut to make a join with the milk room wall framing.

ROOFING.—The roof of the structure is to be sheeted with 26g. 10 x 3" corrugations Red Orb or Red Zincanneal sheet, fixed with a side lap of $1\frac{1}{2}$ corrugations and secured in accordance with standard practice.

10' lengths for the milking bails.
7' lengths for the milk room.

WALL SHEETING.—With the exception of the milk room, rear and side walls are sheeted with 7' lengths of 26g. Red Orb or Red Zincanneal 10 x 3" corrugations. Sheets are cut and lapped to fit gable ends as required. Sheets are to be side lapped one corrugation, end lapped a minimum of 4", and fixed with spring-headed roofing nails.

Where Dairy Regulations permit the use of galvanized iron for the walls of the milk room, these can be similarly sheeted with 7' and 10' sheets cut to size.

Where Dairy Regulations stipulate timber sheeting for milk rooms, a suitable wall sheeting is 6" rusticated weatherboards, fixed to the vertical 4" x 2" studding, the bottom weatherboards being bellcast to form a ventilating panel some 12" above ground level.

RIDGE CAPPING.—Ridge capping is to be of standard section formed from 18" wide strips of 24g. "Queen's Head" galvanized iron or Zincanneal sheet in 6' or 8' lengths. Ridging is lapped a minimum of 6" at the joints and securely fixed in position in conjunction with the roofing sheets.

FLASHING.—Flash roofing at junctions of the side wall of milk room with main shed and washing room annexe with 18" wide strip of 26g. "Queen's Head" or Zincanneal sheet.

EAVES GUTTERS.—Gutters are to be $4\frac{1}{2}$" beaded-edge quadrant type, formed from 24g. "Queen's Head" galvanized sheet or Zincanneal in 6' or 8' lengths. These are fixed in position with required falls to outlets, lapped, double riveted, soldered at joints, and secured to rafters with 16g. galvanized brackets.

DOWNPIPES.—Provide and fix 3" dia. downpiping of 24g. "Queen's Head" galvanized sheet or Zincanneal sheet, formed in 6' and 8' lengths. Water storage tanks are to be provided in approved positions with combined capacity of at least 2,000 gallons.

LINING.—The milk room must be lined on the four inside walls. The ceiling is formed by lining the underside of rafters and collar ties. Collar ties should be fixed at about one-half the roof height and not less than 10' from the floor. 24g. "Queen's Head" or flat Zincanneal sheet is recommended for this purpose, lapped 1" and nailed to studs and roof framing with $\frac{3}{4}$" galvanized clouts.

VENTILATION.—In timber frame walls, ventilation is provided on at least two sides of the milk room by a 6" ventilating panel 12" above the ground. This is covered with rust-proof fly wire. Upper ventilation is to be by louvred ventilators, each at least 2' x 18", set in gable end walls to ventilate above and below ceilings. All ventilators should be fly-proofed with rust-proof fly wire placed behind the louvres.

DOORS.—Bail exit doors are to be 5' x 2' 4", framed up with 5" x $1\frac{1}{2}$" timbers and sheeted with 5' lengths of 26g. 10 x 3" corrugations Red Orb or Red Zincanneal sheet. Each door is to be hung with two 9" heavy T-hinges, and suitably fitted with door-operating mechanism. A self-closing fly-proof door is provided to the milk room.

WINDOWS.—A glazed window is to be provided in the milk room with a total area equivalent to 1/10th of the floor area; 4' x 2' 6" is a suitable size. If the window is placed in a northern or western wall an external hood is to be provided.

BAIL CONSTRUCTION.—Use of the suspended crush is recommended in all cases for machine type bails, whether constructed of hardwood or tubular metal. The 7' width of milking bails allows of crushes each 4' x 2' 4", framed up, if in timber, in 3" x 2" members. Each double bail is separated from the adjacent group by division posts and rail fences formed of 6" x 1" dia. rails checked into 4" x 4" posts and wall studs.

Bailing is carried out by chains attached to the division walls and suspended on the bail heads.

WASHING FACILITIES.—Facilities for the supply of adequate quantities of boiling water and/or steam under pressure must be installed. These are fitted to the owner's requirements.

RACKS.—Racks are to be provided in the milk room for the storage of empty milk cans, buckets, separator parts, and other utilities. Similarly, wash troughs and drainers are installed in the wash room. The racks, shelves, and wash-up trough should be without legs, each being braced back to the wall to allow of easy cleaning of the floor.

PAINT.—All timber, both inside and outside the building, to be painted with oil paint.

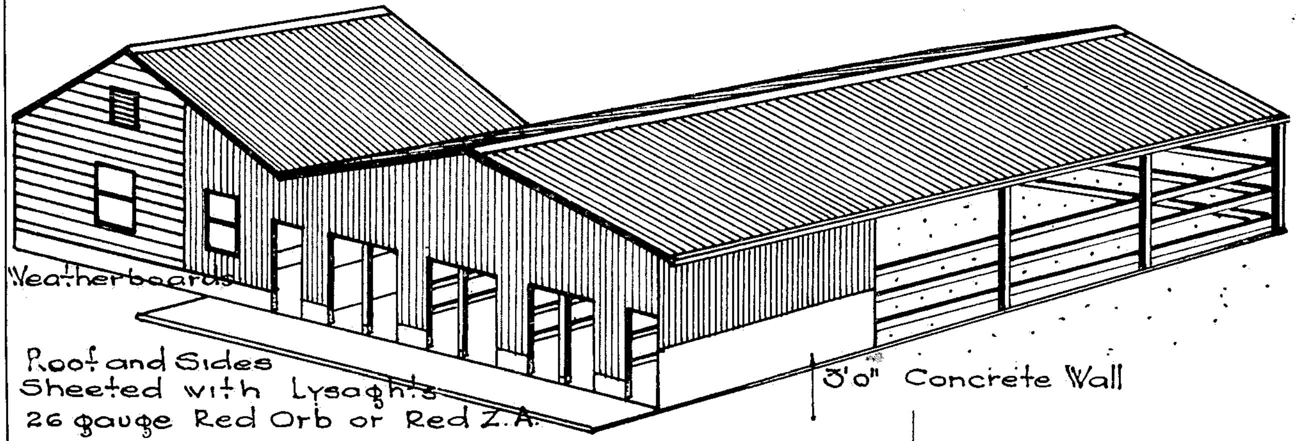
NOTE.—Before construction commences on any milking bail shed, the plan should be submitted to the appropriate authority for approval, e.g., the Milk Board in N.S.W.

DAIRY SECTION

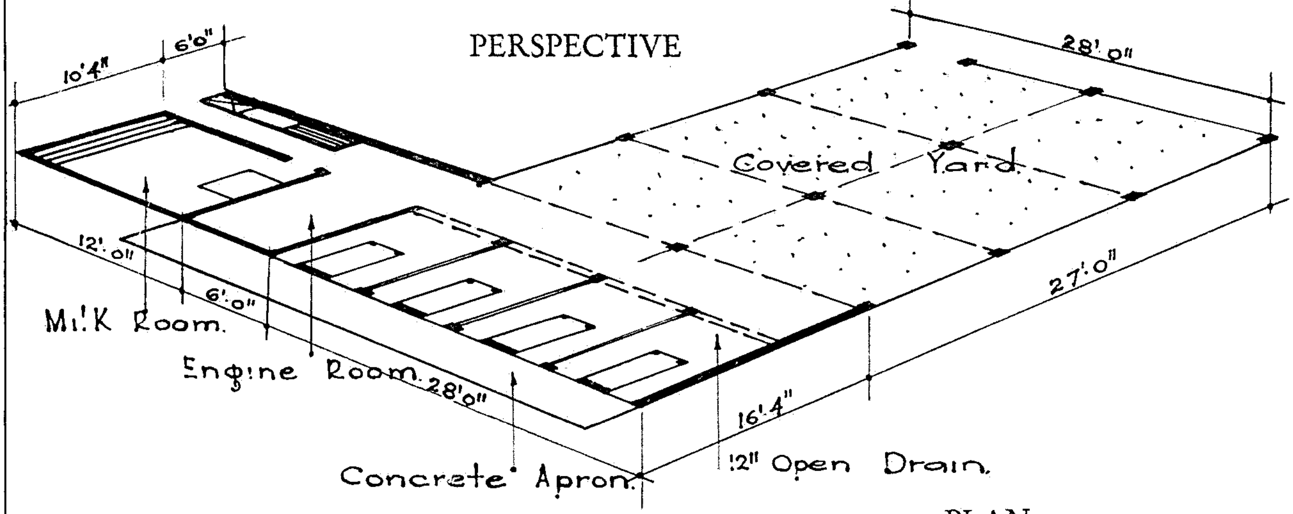
LYSAGHT'S
COUNTRY SERVICE

SHEET 4326

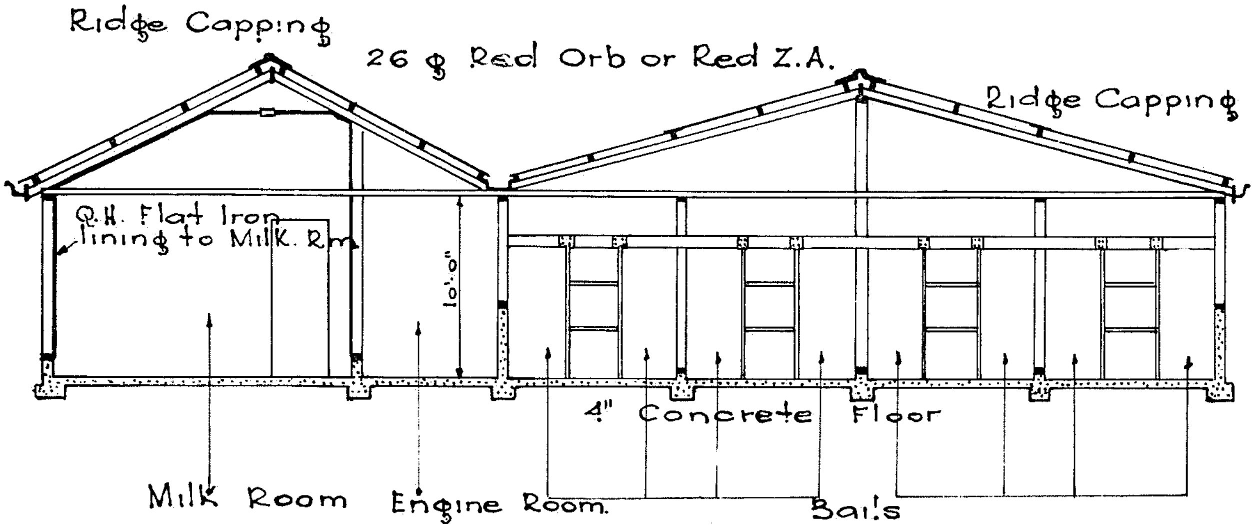
DOUBLE BAILS — MACHINE MILKING — WITH SHELTER YARDS.



PERSPECTIVE



PLAN



CROSS SECTION

JOHN LYSAGHT (AUST.) PTY. LTD.

DAIRY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4326

DOUBLE BAILS — MACHINE MILKING — WITH SHELTER YARDS.

GENERAL.—The milking shed plays a most important part in dairy farming, and the progressive dairy farmer recognizes that a well-planned and properly equipped structure materially assists in the production of the finest quality milk and cream. In the wetter districts of the coastal areas a covered yard is essential, approx. 27' long and extending the width of the bails. The surface of this yard should be preferably concreted, and if not, metalled. For ease of construction, the shape of the component parts is arranged so that the bails and the covered yard are part of the one continuous roof structure.

FLOORS AND DRAINS.—The floors and drains are of 4:2:1 mix concrete, at least 4" thick, cement rendered and graded to provide a fall of all floors into a shallow dished type drain immediately behind the bail back posts. This fall is to be at least 1" in 5' (1 in 60). Where the site is on relatively level ground and the requisite fall is not available, the foundations of the shed are to be raised. The drain is to extend a minimum of 45' away from the dairy premises and yard.

DWARF WALLS.—Under stud walls, concrete dwarf walls 4" thick are to be provided. Dwarf walls at the ends of the bails are to be at least 3' in height, all others to be at least 12" high. Bolts used to fasten plates to the concrete walls are to be $\frac{3}{8}$" dia. split bolts, embedded in the concrete to a depth of not less than 3".

PAVING.—Paving is required outside the bail exit doors (with shallow drains against the wall) to a minimum width of 4' 0". Similarly, with end entrance sheds, an end entrance apron 6' x 6' is required.

POSTS.—Posts are to be set on concrete blocks 6" above the level of the floor and fixed to these blocks with steel straps and split bolts set in concrete. 4" x 4" timbers are used at the bail entrance, 6" x 4" members are used for the central and wall posts of the covered yards. Bail division posts are to be at 7' centres, posts for yards at 9' centres.

WALLS.—All walls are to be a minimum of 8' from highest point in floor to top of roof plate, and framed up in:—

Corner and door studs	4" x 4"
Intermediate studs at 2' to 2' 6" centres	4" x 2"
Top and bottom plates	4" x 2"
Girts checked into studs	3" x 1"
Noggings for milk room	4" x 2"

Bottom plates are fixed to $\frac{3}{8}$" split bolts set in concrete.

Top and bottom plates are 4" x 2", with the exception of the yard, where 6" x 2" top plates are used, checked into and bolted to the 6" x 4" posts.

ROOF FRAMING.—The roof of both bails and milk room are of gable type construction, framed up in:—

Rafters at a maximum spacing of 3' ..	4" x 2"
Battens, maximum spacing 4'	3" x 1"
Ties	4" x 2"
Ridge boards	6" x 1"

ROOFING.—The roof of the structure is to be sheeted with 26g. 10 x 3" corrugations Red Orb or Red Zincanneal sheet, fixed with a side lap of $1\frac{1}{2}$ corrugations and an end lap of 6". 12' lengths and 10' lengths to the milk room (the 12' lengths provide an overhang). 8' lengths to the bail and shelter yard. Sheets are nailed to battens with spring-headed roofing nails.

WALL SHEETING.—The walls of the bails and engine room are sheeted with 26g. 10 x 3" corrugations Red Orb or Red Zincanneal sheets. Sheets are to be side lapped one corrugation, and where applicable end lapped a minimum of 4". Sheets are fixed with spring-headed roofing nails. Where Dairy Regulations allow of side sheeting with galvanized iron, then the sides of the milk room are sheeted with 7' lengths of 26g. Red Orb or Red Zincanneal. Where Dairy Regulations stipulate timber sheeting for milk rooms, then a suitable sheeting is weatherboard fixed on to the vertical 4" x 2" studding, complete with corner moulds. The lower weatherboards are bellcast to form a suitable ventilating panel some 12" above ground level.

RIDGE CAPPING.—Ridge capping is to be of standard section, formed with 18" wide strips of 24g. Queen's Head galvanized iron or Zincanneal sheet in 6' or 8' lengths. Ridging is lapped a minimum of 6" at the joints and securely fixed in position in conjunction with the roofing sheets.

EAVES GUTTERS.—Gutters are to be $4\frac{1}{2}$" beaded-edge quadrant type, formed from 24g. "Queen's Head" galvanized sheet or Zincanneal in 6' or 8' lengths. These are fixed in position with required falls to outlets, lapped, double riveted, soldered at joints, and secured to rafters with 16g. galvanized brackets.

BOX GUTTER.—The box gutter between the bails and milk room is to be formed from 24g. "Queen's Head" galvanized iron or Zincanneal flat sheets, laid with a fall of $1\frac{1}{2}$" to the outlet. Sheets are to be carefully bent to shape and laid on timber boarding.

DOWNPIPES.—Provide and fix 3" dia. downpiping of 24g. "Queen's Head" galvanized sheet or Zincanneal sheet, formed in 6' or 8' lengths. Water is carried away to storage in approved positions with combined capacity of at least 2,000 gallons.

LINING.—The milk room must be lined on the four inside walls and below roof contour on the underside of rafters and collar ties at about one-half the roof height, and not less than 10' above the floor. 24g. "Queen's Head" or Zincanneal sheet is recommended for this purpose, lapped 1" and nailed to studs with $\frac{3}{4}$" galvanized clouts.

VENTILATION.—In timber-frame walls, ventilation is provided on at least two sides of the milk room by a 6" ventilating panel 12" above the ground. This is covered with rust-proof fly wire. Upper ventilation is to be by louvred ventilators, each at least 2' x 18", set in gable end walls to ventilate above and below ceilings. All ventilators should be fly-proofed with rust-proof fly wire placed behind the louvres.

DOORS.—Bail exit doors are to be 5' x 2' 4", framed up with 5" x $1\frac{1}{2}$" timbers and sheeted with 5' lengths of 26g. 10 x 3" corrugations Red Orb or Red Zincanneal sheet. Each door is to be hung with two 9" heavy T-hinges and suitably fitted with door-operating mechanism. A self-closing fly-proof door is provided to the milk room. Provide one 6' 8" x 2' 8" standard door to washroom annexe.

WINDOWS.—A glazed window is to be provided in the milk room with a total area equivalent to one-tenth of the floor area; 4' 0" x 2' 6" is a suitable size. If the window is placed in a northern or western wall an external hood is to be provided.

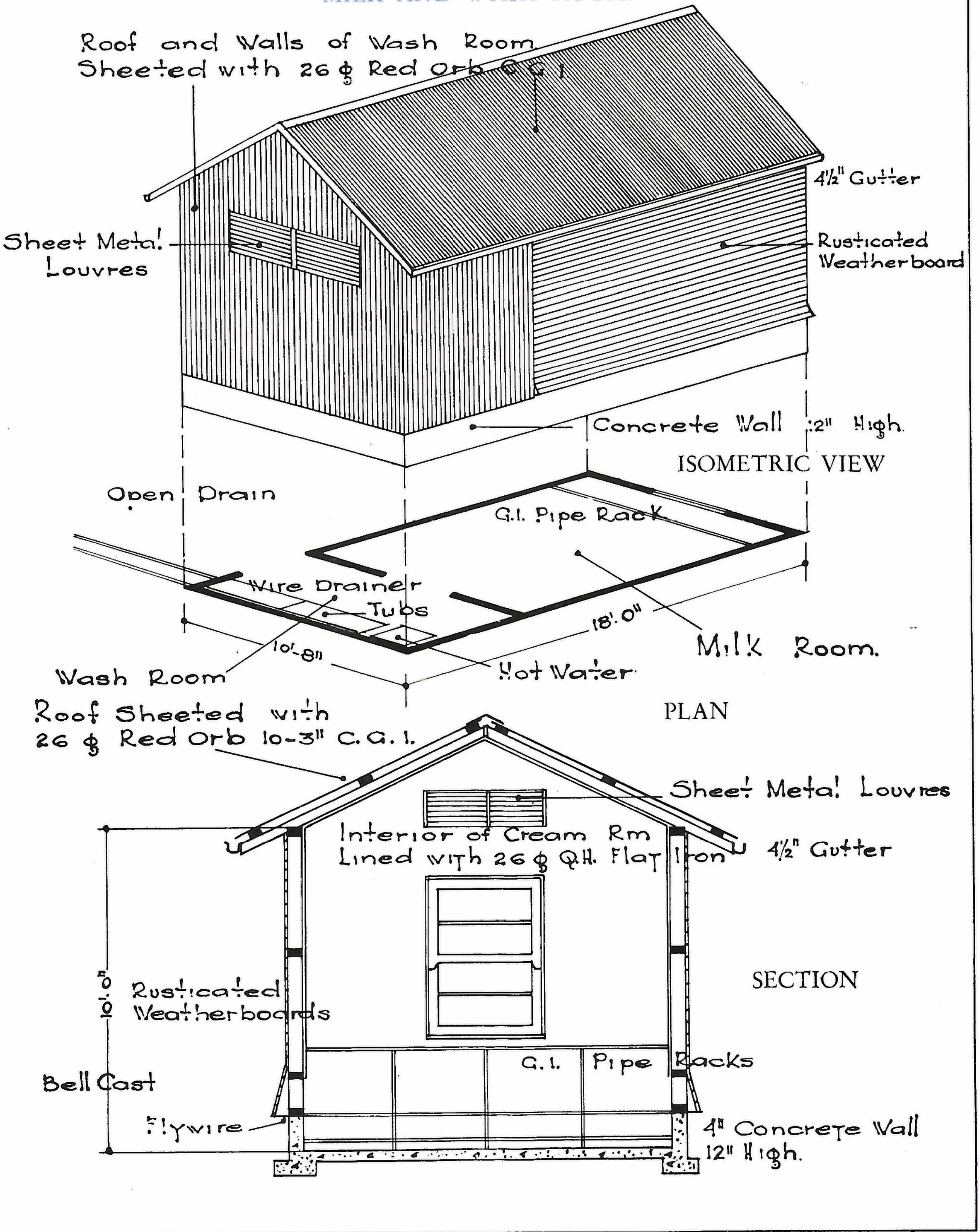
BAIL CONSTRUCTION.—Bail divisions and crushes are formed from 2" galvanized iron pipe welded together. Bailing is carried out by chains attached to the 2" posts and division walls.

WASHING FACILITIES.—Facilities for the supply of adequate quantities of boiling water and/or steam under pressure must be installed.

RACKS.—Racks are to be provided in the milk room for the storage of empty milk cans, buckets, separator parts, and other utilities. Similarly, wash troughs and drainers are installed in the wash room. The racks, shelves, and wash-up trough should be without legs, each being braced back to the wall and allowing of easy cleaning of the floor.

YARDS.—The covered in yards are provided with rail fences formed from 6" x $1\frac{1}{2}$" rails (height of top rail 4" to 6"), nailed to 6" x 4" yard posts.

MILK AND WASH ROOM.



DAIRY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4332

MILK AND WASH ROOM.

GENERAL.—The term separating room or milk room is used here as laid down in the New South Wales Department of Agriculture Dairy Manual, which states: "The term milk room includes all buildings and rooms on dairy premises set apart for the purposes of depositing or storing milk or cream for consumption or for butter making, cheese making, drying, condensing, separating, straining, or cooling the same; or for washing or storing vessels and utensils used in their production, preparation or conveyance."

Dependent on whether milk is being produced for human consumption or conversion to other products, so the dairy layout is arranged.

1. Milk room adjacent to the bails and joined to it, the milk being despatched in cans from this point.
2. Milk or separating room where the cream is separated and stored, utensils washed, etc., the structure being no closer than 30' to the bails. Such a structure is shown overleaf, the larger room being used for separating and storage, the smaller 6'-wide room for washing and cleaning utensils.

FLOOR.—The floor is to be of concrete, 4" thick (minimum 3"), of 4:3:1 mix, cement rendered and graded 1" in 5', so that the washings can be easily and rapidly drained away to an open and shallow drain, and the intersections of the floor and dwarf walls are to be rounded to assist cleaning. The surface of the floor must be at least 6" above the surface of the surrounding ground.

DWARF WALLS.—All wall framing is to be placed on concrete dwarf walls 4" thick and 12" above floor level. Bottom plates are bolted to this dwarf wall by ⅜" diameter split bolts, set in concrete a minimum depth of 3".

DRAINAGE.—Drainage must be provided for a detached separator room, by means of an open concrete drain, extending at least 15 yards from the room. This drain is to be cement rendered and graded at least 1" in 12'.

REINFORCEMENT.—All dwarf walls used in the construction should preferably be reinforced at the intersection of the floor and wall by means of short lengths of reinforcement rod or ½" wire netting, embedded in the concrete. The embedded netting must extend not less than 12" each side of the angle made by the floor with the walls.

WALL FRAMING.—Mill-sawn timber should be used in the construction of the separator room, preferably hardwood or cypress pine. Frame up walls with:—

Corner studs and posts	4" x 4"
Intermediate studs	4" x 2"
Top plate, bottom plate, noggings	4" x 2"

Provide window and door framing in suitable timbers. The minimum height of the walls, including the dwarf walls, is to be 10'.

ROOF FRAMING.—The roof structure is formed of:—

Rafters	4" x 2"
Ridge board	6" x 1"
Battens	3" x 1½"
Battens for lining and finishing	2" x 1"

The roof should project 2' on each side of the building.

WALL SHEETING.—Where Dairy Regulations stipulate timber sheeting for the milk room, then the walls of this room are covered with weatherboards, while the annexe is sheeted with galvanized iron or Zincanneal steel sheet. The bottom weatherboards are bellcast to form a ventilating panel some 12" above ground level.

Where Dairy Regulations permit the use of steel sheet for the walls of the milk room, then the complete structure can be sheeted with a Lysaght product to the individual owner's requirements. Available are:—

1" corrugation Ripple Iron.
3" corrugations Red Orb or Red Zincanneal.
V. Crimp Sheet.

ROOF SHEETING.—The roof is sheeted with 8' lengths of Lysaght's 10 x 3" corrugations 26g. Red Orb, with 1½ corrugations side lap. These are secured to battens with spring-headed roofing nails, pierced through the top of every second corrugation at end laps and three to each sheet at intermediate battens.

RIDGING.—Provide 18" standard ridging with end stops, of 24g. "Queen's Head" or Zincanneal sheet.

EAVES GUTTERS.—Eaves gutters are to be 4½" 24g. "Queen's Head" galvanized iron, beaded edge, quadrant gutters, in 6' or 8' lengths, fixed in position with required falls to outlets, lapped, double riveted, soldered at joints, and secured to rafters with 16g. galvanized brackets. Gutters are cut to receive thimble connections of downpipes, and properly soldered at these junctions.

DOWNPIPE.—Provide 24g. 3" diameter "Queen's Head" galvanized sheet downpipe, with the necessary bends and joints, to carry water away to a 1,000-gallon squat tank.

LININGS.—The milk room must be lined on the four inside walls. Lysaght's 24g. "Queen's Head" or Zincanneal flat sheet is recommended for this purpose, lapped, and nailed to studs with ¾" galvanized clouts. Zincanneal flat sheet has the advantage of being immediately ready for painting, without any weathering or priming. With the addition of a cream colour proprietary oil paint, the inside of the separator room can be given a most pleasing appearance.

The ceiling must be lined, to follow the contour of the roof, which must be of the gable or hip type (skillions are not allowed). At the junction of the walls with the ceiling, the lap should be such that the wall sheet is on the inside. This latter is a precaution for any dislodgment of dust to fall outside the room and not on the exposed milk or cream inside the room.

VENTILATION.—One of the principal features to be provided is an efficient system of ventilation. In the milk and wash-up rooms, hot and boiling water have to be provided and used freely. This creates steam and warm, humid air. Ventilation in the suggested layout is carried out by:—

6" ventilating panel, 8" above the ground level, on at least two sides of separator room.
Gable louvres at ends.

All apertures of the milk room must be lined with rust-proof fly wire.

WINDOWS.—A fixed window, not less than 3' x 2', should be inserted in the milk room for lighting purposes. If desirable, the window should be protected against the influence of sun and rain by a properly constucted hood or shutters.

DOORS.—A self-closing fly-proof door should be provided in the opening leading to the milk room.

WASH ROOM.—An annexe of not less than 6' x 10' must be provided at one end of the milk room. An open drain must be connected to this building, to carry off all floor washings, etc., to a minimum distance of 15' from the building. Washing conveniences are to be provided in this room.

RACKS.—In every milk room, whether it is attached to the bails or in a separate building, racks are to be provided for the storage of empty milk cans, buckets, separator parts, and other utensils, after the same have been thoroughly washed and scalded. Such racks should be made of galvanized iron pipe (if not available, this may consist of well-dressed hardwood).

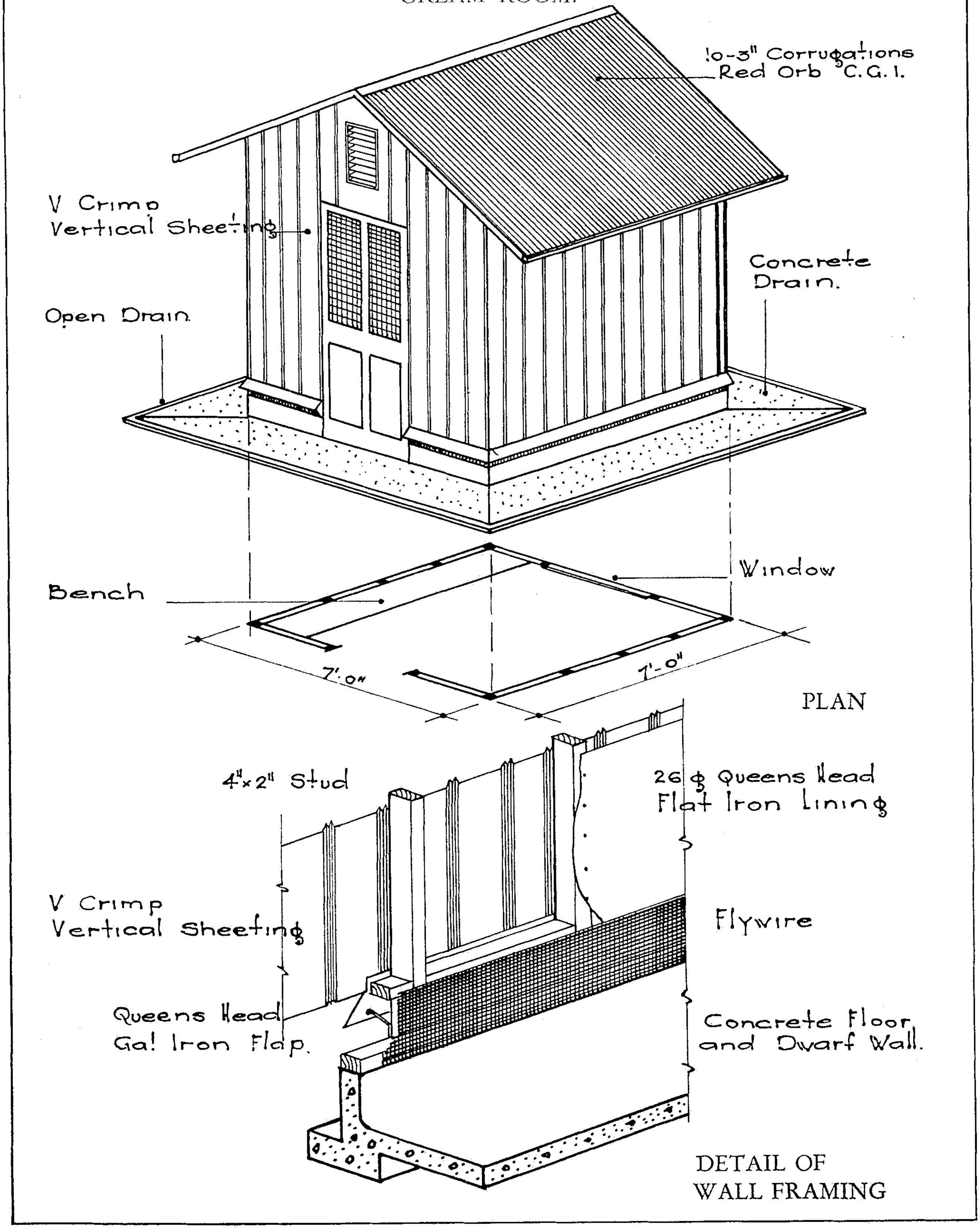
SEPARATOR BLOCK.—When a separator is supported on a block, this must be of concrete, plastered to a smooth surface. The intersections of the sides with the concrete floor to be rounded and covered. Separator room racks and shelves should be without legs, wash-up troughs, racks, etc., being braced back to the walls.

DAIRY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4333

CREAM ROOM.


10-3" Corrugations Red Orb C.G.I.
V Crimp Vertical Sheeting
Concrete Drain.
Open Drain.
Bench
Window
7'-0"
7'-0"
PLAN
4"x2" Stud
26 g Queens Head Flat Iron Lining
V Crimp Vertical Sheeting
Flywire
Queens Head Gal Iron Flap.
Concrete Floor and Dwarf Wall.
DETAIL OF WALL FRAMING

LYSAGHT'S
COUNTRY SERVICE

CREAM ROOM.

GENERAL.— Where a separate room for the storage of cream is provided, it is to be situated at least 30' away from the bails and cow yards, and should be not less than 7' x 7', height to be 8', measured from floor to underside of top plate. The sketch overleaf shows a typical cream room or "creamery."

FLOOR.— The floor is to be 4" thick concrete of 4:3:1 mix, and is to be paved to a minimum thickness of ¾" with two parts blue metal toppings and one part of cement. Provide minimum fall of 1 in 60 to outlets, and steel trowel to smooth and even surface, so that the washings can be easily and rapidly drained away to a shallow, open drain. The surface of the floor should be at least 6" above the surface of the surrounding ground.

DWARF WALLS.— All wall framing is to be placed on concrete dwarf walls, 4" thick, and 12" above floor level. The intersection of the floor and dwarf walls is to be coved to assist cleaning. Bottom plates are bolted to the dwarf wall by ⅜" dia. split bolts, set in concrete a minimum depth of 3".

DRAINAGE.— Drainage of the surrounds of the cream room is provided by means of a sloping concrete apron, extending 3'-4' on all sides of the structure, so graded that surface water is carried away by means of an open concrete drain, extending some 30' from the room and connected to a suitable rubble drain or other means of dispersal. This drain is to be cement rendered, and graded at least 1" in 12'.

WALL FRAMING.— Mill-sawn timber must be used in the construction of the cream room, preferably hardwood or cypress pine. Frame up walls with:—

Corner studs	4" x 4"
Intermediate studs	4" x 2"
Top plate, bottom plate, noggings ..	4" x 2"

Rebated joints, 1" linings, 1½" weather moulds, etc.

ROOF FRAMING.— The roof structure is framed of:—

Rafters, at 21" centres	3" x 2"
Battens	3" x 1"
Ridge board	6" x 1"

Miscellaneous timber for finishing, as required.

WALL SHEETING.— Lysaght steel sheeting is most suitable as covering material, and the individual owner has a wide variety from which to choose, depending upon taste and the amount to be spent. There are available—1" Ripple Iron, 8 or 10 corrugations wide 3" corrugations Red Orb or Z.A., 8" Steel Weatherboards, and "V" Crimp sheet, as illustrated here. This "V" Crimp is shown used vertically, but can be used horizontally, if the horizontal appearance is preferred.

ROOF SHEETING.— The roof is sheeted with 6' lengths of Lysaght's 10 x 3" corrugations 26g. Red Orb, with 1½ corrugations side lap. Sheets shall be secured to battens with spring-headed roofing nails, pierced through the top of every second corrugation at end laps, and three to each sheet at intermediate battens.

RIDGE CAPPING.— Ridge capping is to be of standard section, formed from 18" wide strips of 24g. "Queen's Head" galvanized iron or Zincanneal sheet in 6' or 8' lengths. Ridging is lapped a minimum of 6" at the joints and securely fixed in position in conjunction with the roofing sheets.

EAVES GUTTERS.— Eaves gutters are to be 4½" 24g. "Queen's Head" galvanized iron, beaded edge, quadrant gutters, fixed in position with required falls to outlets, lapped, double riveted, and soldered at joints, secured to rafters with 16g. galvanized brackets. Gutters are cut to receive thimble connections of downpipes, and properly soldered at these junctions.

DOWNPIPE.— Provide 3" diameter 24g. "Queen's Head" galvanized sheet downpipe, with the necessary bends and joints, to carry water away to storage or to the nearest drain.

LININGS.— The cream room must be lined on the four inside walls and ceiling. Lysaght's 24g. "Queen's Head" or Zincanneal flat sheet is recommended for this purpose, lapped 1", and nailed to studs with ¾" galvanized clouts. Zincanneal flat sheet has the advantage of being ready immediately for painting, without any weathering or priming.

The ceiling must be lined, to follow the contour of the roof, which must be of the gable or hip type (skillions are not recommended). At the junction of the wall lining with that of the ceiling, the lap should be such that the wall sheet is on the inside. This latter is a precaution for any dislodgment of dust to fall outside the room, and not on the stored cream inside.

VENTILATION.— The creamery should be provided with the most efficient system of ventilation possible, and cold winds should be utilised to their fullest advantage. Ventilation in the suggested layout is carried out by:—

6" ventilating panel, 8" above floor level. on at least two sides.
Gable louvres at two ends, 18" x 12".
6" eaves ventilating panel.

All ventilation openings must be sealed with rust-proof fly wire.

WINDOWS.— A fixed window, not less than 3' x 2', should be inserted in one wall, for lighting purposes. This can be protected from the influence of sun by shutters. Alternatively, this opening can be covered by a fixed fly-screen internally, and shutters opening externally, thus dispensing with a glazed framework.

DOORS.— Two doors should be provided in the opening leading to the separator room.

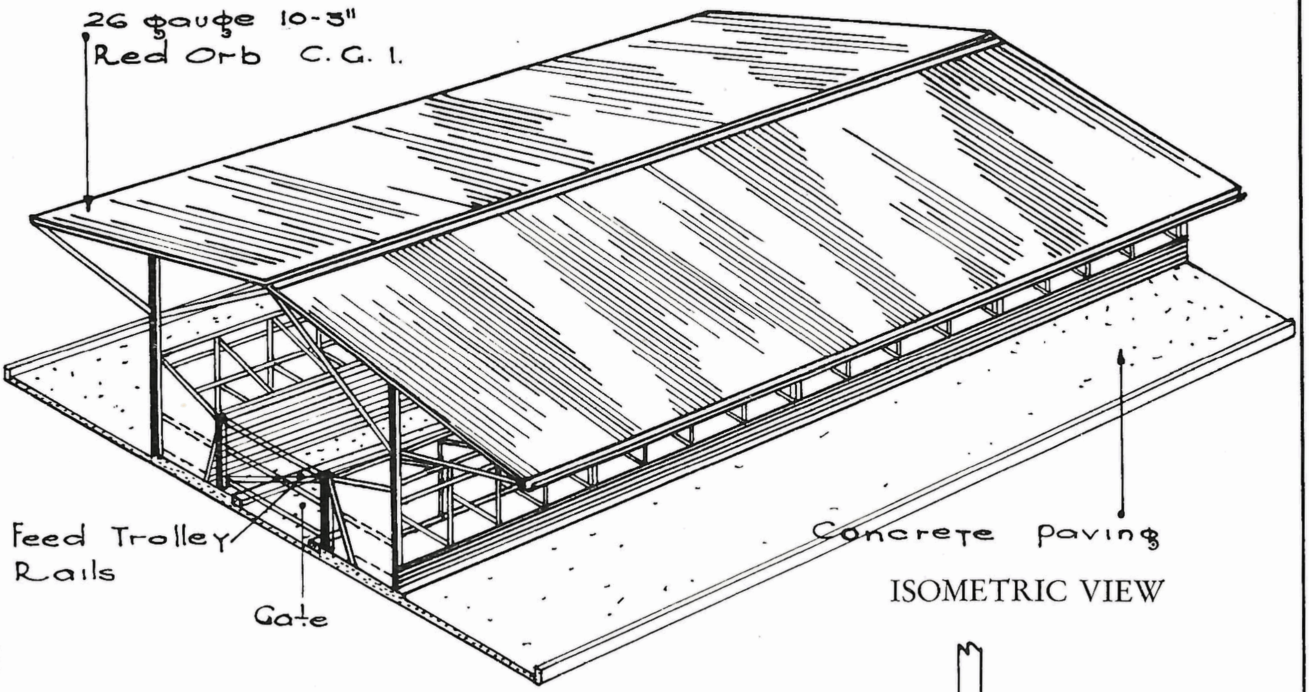
The inner door should be 6' 8" x 2" 8" x 1½", framed, ledged and braced door, sheeted with 4" x ½" V-jointed cypress boarding on the outside.

The external door should be 6' 8" x 2' 8" x 1½", lower half sheeted with T. & G. V-jointed cypress boarding. Top half to be divided into two panels, each filled in with rust-proof flywire.

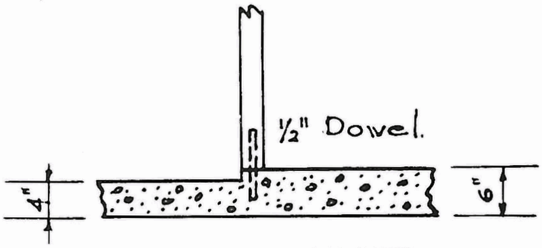
RACKS.— In every cream room, racks are to be provided for the storage of cream cans. Such racks should be made of galvanized iron pipe.

PAINTING.— Paint all external woodwork two coats of oil paint. Paint all interior and exterior Zinacneal one coat of oil paint.

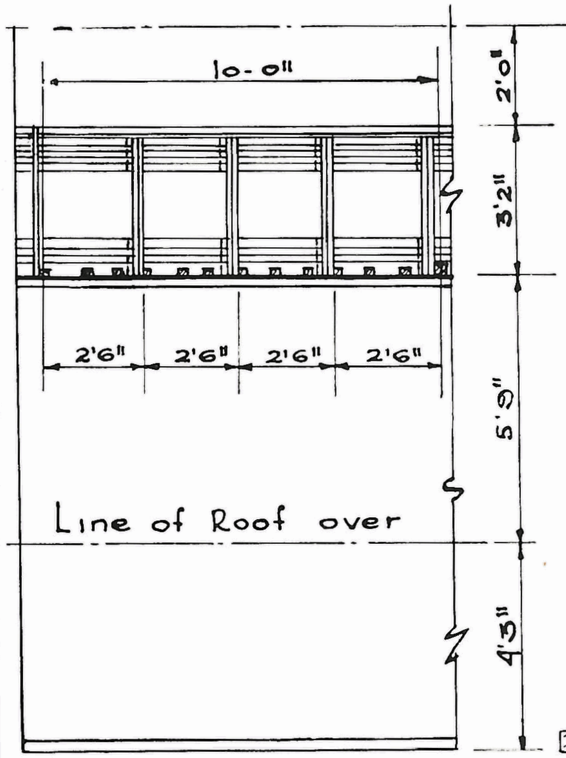
FEEDING STALLS



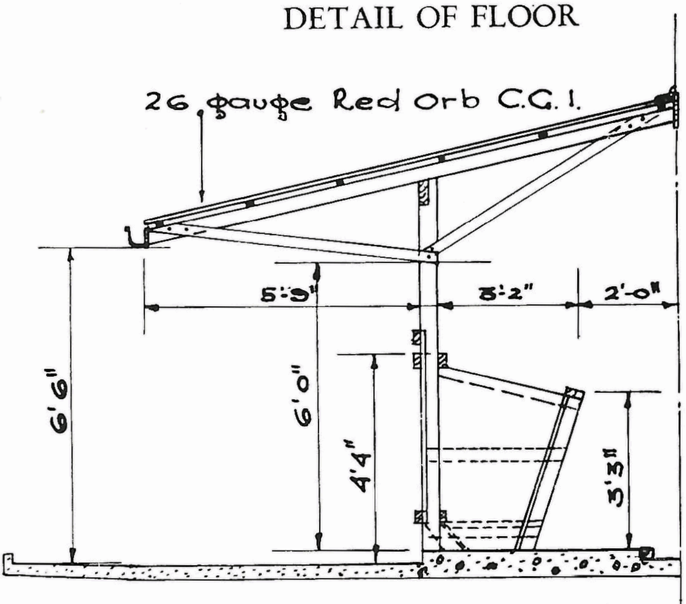
ISOMETRIC VIEW



DETAIL OF FLOOR



PORTION OF PLAN



HALF SECTION

LYSAGHT'S COUNTRY SERVICE

FEEDING STALLS

GENERAL.—It is better to feed the cows away from the bails, and this, in fact, is laid down in most milk zones, where the feeding stalls should not be closer than 40' to the milking bails. An ideal arrangement is that illustrated overleaf, where the stalls are arranged on either side of a feed alleyway, the whole being enclosed under a partly cantilevered roof. As a rule a trolley line is laid down in the alleyway to carry feed to the various troughs from the feed room.

Mill sawn timber, as illustrated, should be used for preference. Many farmers, due to the availability of local hardwood and cypress pine, prefer to use round or axed square timber.

FLOORS AND DRAINS.—The feeding stalls are to be constructed over concrete floors properly graded and drained to carry away all washings. Floors and drains are to be of concrete, 5:3:1 mix, at least 4" thick, cement rendered and steel trowelled to a smooth finish, graded at least 1" in 12'. To facilitate cleaning, the floor is stepped down 2" minimum at edge of mangers and provided with a 4" x 2" curb, some 10' out from the edge of the manger. The entire floor is graded to fall towards the centre of this 10', thus forming a wide, shallow drain. These concrete aprons are drained into a shallow drain at the end of the structure, and the washings can be drained away outside the limits of the feeding stall yards to a suitable disposal area.

4" x 3" wooden rails or light 30lb. steel rails (whichever are available) are set in concrete in the feeding alleyway.

POSTS.—The main posts are to be 4" x 4" sawn timber, 10' apart, the height being arranged to give a minimum clearance of 6' 6" under the eaves. Bail posts are to be 4" x 3". Posts are fixed to the floor by means of a steel rod dowel set to a depth of 3" below the floor surface.

ROOF FRAMING.—The roof framing is arranged to carry complete 12' lengths of 26g. Red Orb or Red Zincanneal corrugated sheet. The roof structure is framed up in:—

4" x 2" rafters at 3' 4" centres.
4" x 2" top plates checked in and bolted to 4" x 4" vertical posts.
3" x 1½" battens at 4' centres.
4" x 2" struts.
3" x 2" plate fixed to rafters and struts.

BAIL STRUCTURE.—Posts and roof framing are made more rigid by the internal manger and bailing subdivision timbers, all posts being secured together by 3" x 1½" horizontal rails. Bailing is carried out by a series of 3" x 1" bail sticks pivoted at the bottom and bolted at the top by a long 3" x 1½" paling handle. Mangers are arranged four per bay, being suitably framed up in 3" x 2" and 3" x 1½" timbers.

ROOFING.—The roof is to be sheeted with 12' lengths of 26g. 10 x 3" corrugations Red Orb or Red Zincanneal, fixed with side lap of 1½ corrugations. Sheets to be fixed with spring-headed roofing nails pierced through the top of every second corrugation at ends and every fourth corrugation at intermediate points.

RIDGE CAPPING.—Ridge capping is to be formed from 18" wide strips of 24g. Queen's Head galvanized iron or Zincanneal R.L. Ridging is lapped a minimum of 6" at the joints and securely fixed in position in conjunction with roofing sheets.

EAVES GUTTERS.—Eaves gutters are to be 4½" beaded-edge quadrant type, formed from 6' or 8' lengths of 24g. Queen's Head galvanized iron or Zincanneal. These are fixed in position with required falls to outlets, lapped, double riveted, soldered at joints, and secured to rafters with 16g. galvanized brackets. Gutters are cut to receive thimble connections of downpipes and properly soldered at these junctions. Provide galvanized wire grating at outlets.

DOWNPIPES.—Provide and fix 24g. 3" diameter downpiping of Queen's Head galvanized sheet or Zincanneal, formed in 6' or 8' lengths.

MANGER SHEETING.—For the front of the manger, use 12' sheets of 8 x 3" corrugations 26g. Red Orb or Red Zincanneal sheet. For the rear, end linings, ends, and division walls, use 36" wide, 24g. Queen's Head sheet.

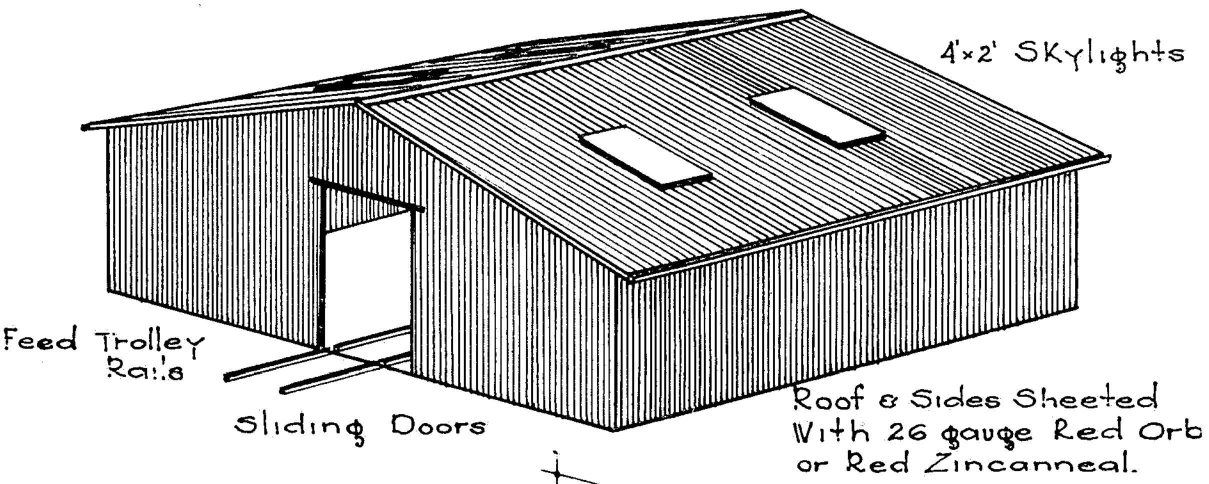
LYSAGHT
ORB
AUSTRALIA

DAIRY SECTION

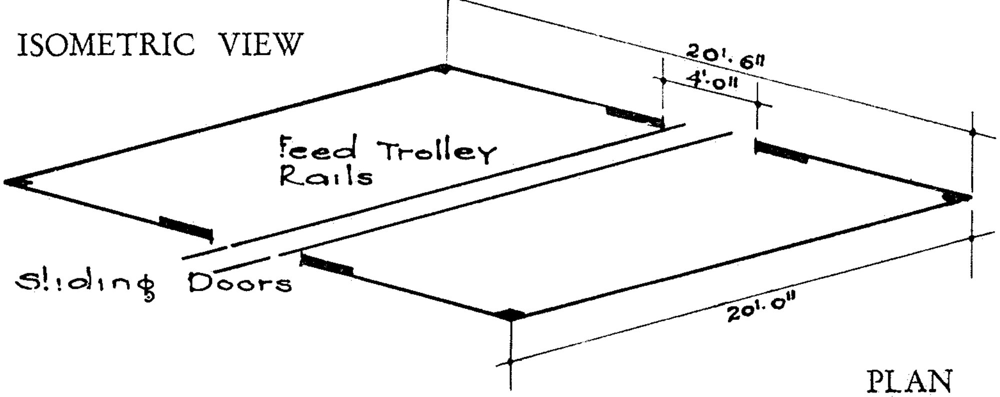
LYSAGHT'S
COUNTRY SERVICE

SHEET 4345

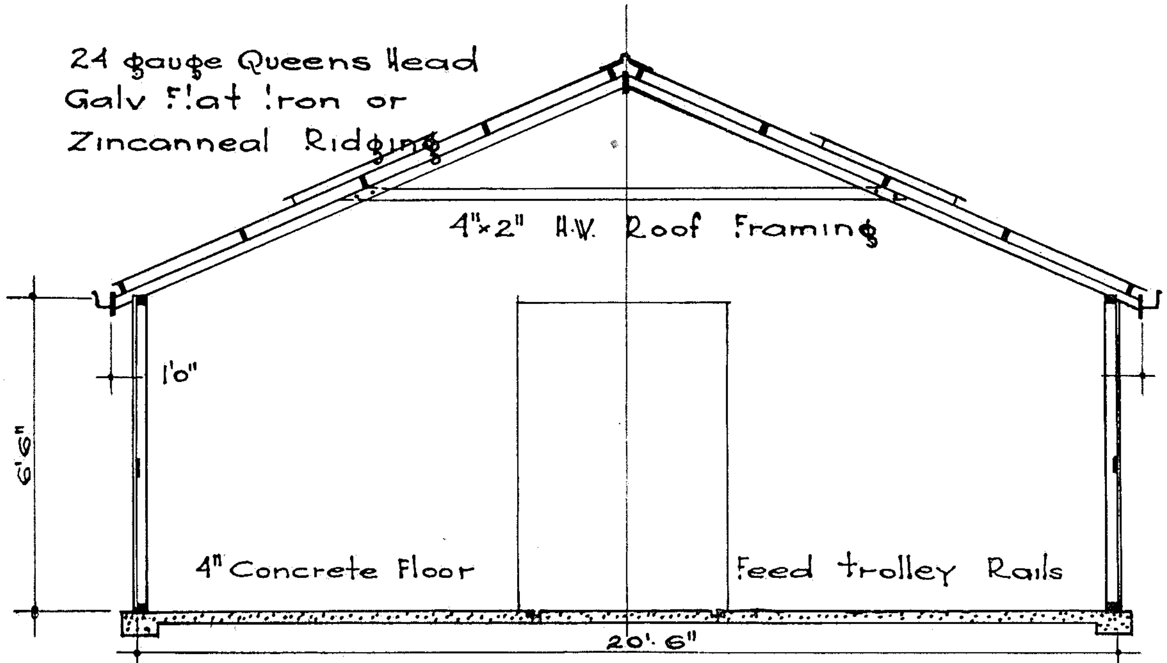
FEED ROOM


4'×2' Skylights
Feed Trolley Rails
Sliding Doors
Roof & Sides Sheeted With 26 gauge Red Orb or Red Zincanneal.

ISOMETRIC VIEW



PLAN



CROSS SECTION

DAIRY SECTION

LYSAGHT'S
COUNTRY SERVICE

SHEET 4345

FEED ROOM

GENERAL.— The feed or concentrates room is a very necessary adjunct to an efficient feeding stalls layout, and is generally placed between the feeding stalls and the monolithic silos. The dimensions depend upon the amount of feed to be held, but, in general, the height and width conform to those of the feeding stalls, of which the feed room is almost invariably an extension. This is so in the sketch illustrated overleaf, where the height is 6' 6" at the eaves, width 22', length two bays of 10' i.e., 20'. Skylights are used in preference to windows. By using skylights, bags of feed may be stacked as high as possible.

FLOOR.— The floor is to be of 5:3:1 concrete, 4" thick, cement rendered and graded at least 1" in 12' at the door openings. Rails of timber or steel are set in concrete to take the travel of the feed trolley.

DWARF WALLS.— The wall framing is to be set on a concrete curb 4" above floor level. The intersection of walls and floors should be rounded to avoid accumulation of dirt at the angles. Bottom plates are bolted to the curbs by ½" dia. bolts set in concrete a minimum depth of 3".

POSTS.— All corner studs, intermediate studs at 10' centres, and internal posts are to be of 4" x 4" timber. Internal posts are set on concrete blocks 6" above floor level and fixed by ½" dia. steel rod dowels, set to a depth of 3" below the floor surface. Intersections of blocks with the floor should be rounded to avoid accumulation of dirt.

WALL FRAMING.— Wall framing for the component parts is arranged to give 6' 6" clearance at the top plate of eaves. Walls are framed up:—

Corner posts and main intermediate studs at 10' centres	4" x 4"
Intermediate studs at 3' 4" centres ..	4" x 2"
Top and bottom plates	4" x 2"
Girts checked into studs	3" x 1"
Diagonal braces	3" x 1"
Plate over Doorways	4" x 3"

ROOF FRAMING.— The roof framing is arranged to take 12' sheets of Red Orb or Red Zincanneal sheet, as a continuation of the feed stalls, and consists of:—

4" x 2" rafters bird's-mouthed over top plates of walls and nailed to 6" x 1" ridge board and braced with 4" x 2" collar ties.

ROOF SHEETING.— The roof is sheeted with 12' lengths of 26g. 10 x 3" corrugations Red Orb or Red Zincanneal sheet, fixed with a side lap of 1½ corrugations. Sheets are nailed to battens with spring-headed nails, pierced through the top of every second corrugation at the ends and every fourth corrugation at intermediate battens.

WALL SHEETING.— Walls are sheeted with 6' length of 26g. 10 x 3" corrugations Red Orb or Red Zincanneal sheet, fixed with a side lap of one corrugation and, where applicable, an end lap of 4". Sheets are fixed with spring-headed nails pierced through the top of every second corrugation at ends of sheets and every fourth corrugation at intermediate battens.

RIDGE CAPPING.— Ridge capping is to be formed from 18" wide strips of 24g. Queen's Head galvanized iron or Zincanneal sheet, in 6' or 8' lengths. Ridging is lapped a minimum of 6" at the joints and securely fixed in position in conjunction with the roofing sheets.

EAVES GUTTERS.— Eaves gutters are to be of 4½" beaded-edge quadrant type, formed from 6' or 8' lengths of Queen's Head galvanized sheet or Zincanneal. These are end lapped 1½", double riveted, and soldered over the full width of lap, fixed with required falls to outlets, and secured to rafters with 16g. galvanized brackets. Gutters are cut to receive thimble connections of downpipes and properly soldered at these junctions.

DOWNPIPING.— Provide and fix 24g. 3" dia. downpiping of Queen's Head galvanized sheet or Zincanneal, formed in 6' or 8' lengths. Water is carried away to storage or sumps as required. Wherever possible water should be stored for hosing down the yards.

SKYLIGHTS.— Provide and fix four skylights of the fixed unventilated type.

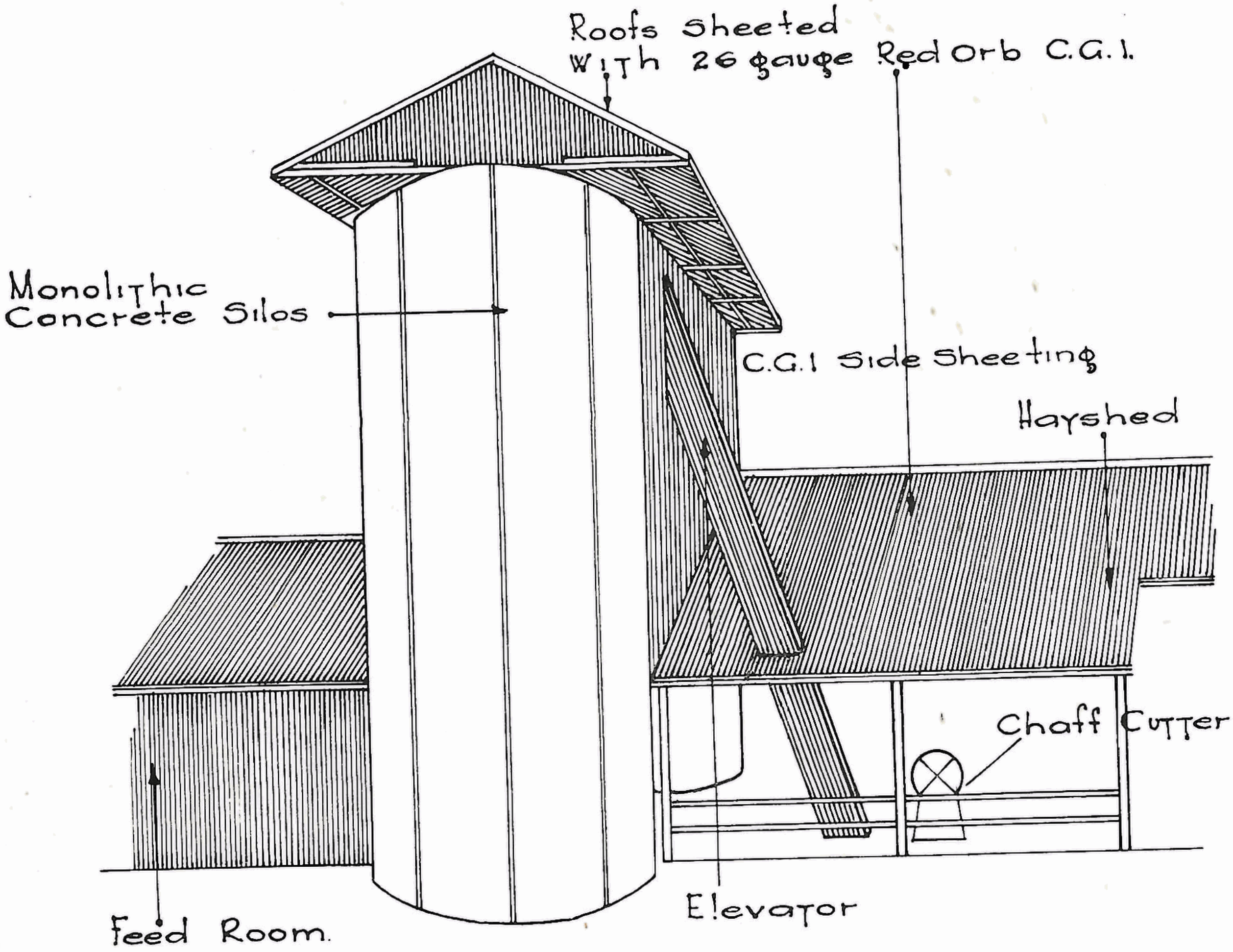
DOORS.— Doors are to be of the sliding type, in two halves, each 2' x 6' 6", arranged with bottom styles so fitting over the rails in the floor that the entrance is verminproof as possible. Openings are to be provided one at feeding stalls end, and one at silo end.

BINS, INTERNAL FITTINGS.— The bins and internal fittings are arranged to suit the individual owner.

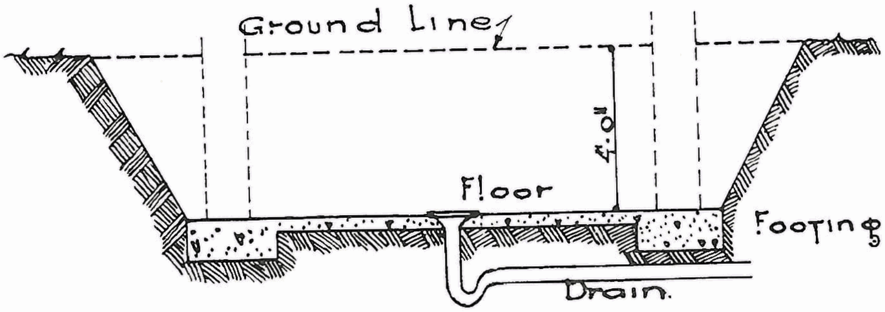
PAINTING.— A galvanized iron roof will last longer if the end and side laps of the sheets are painted before fixing with any good quality roof paint. The points of contact are where corrosion usually begins.

LYSAGHT
ORB
AUSTRALIA

SILOS — GENERAL


Roofs Sheeted With 26 gauge Red Orb C.G.I.
Monolithic Concrete Silos
C.G.I Side Sheeting
Hayshed
Chaff Cutter
Elevator
Feed Room.

VIEW OF SILOS
AND HAY SHED



DETAIL OF
SILO FOUNDATION

DAIRY SECTION

LYSAGHT'S
COUNTRY SERVICE

SHEET 4352A

MONOLITHIC CONCRETE SILOS

GENERAL.—The monolithic concrete silo that stands above ground is the most popular means of storing ensilage.

To keep silage in good condition the silo must be so built that the natural moisture in the ensilage will be retained. Air must be excluded, and the silage must be able to settle freely and uniformly, preventing the formation of air pockets. This is best obtained by a cylindrical-shaped structure, with smooth internal walls. The type, as illustrated overleaf, meets the most exacting conditions. In view of the necessity for the exclusion of air in making silage, it is essential that the walls shall be as airtight and as high as possible consistent with general convenience. Practical conditions limit the height of a silo from 25' to 35'. Above 35' the cost of construction increases rapidly, and the type of elevator which is cheap and suitable to the silos under 35' must be replaced by blowers or by an elevator of more expensive design. With the object of reducing the height above ground, it has been the practice in the past to sink the silo 4' to 5' in the ground. Construct silos with the height twice the width, or even a few feet greater.

Efficient moulds are required for casting of the cylinder. They must be strong and of such construction that they may be taken down and set up again in the shortest possible time. The various corrugated iron moulds fit these requirements admirably, and a typical set and method of construction of the silo is described in Sheet 4352B.

LOCATION.—Practically all silos are built adjacent to the feed or concentrates room and connected to it by a short passage. At the other end of the feed room are the feeding stalls, with a trolley line running through the feeding alley and the feed room to that portion of the silo floor on which the silage is thrown down for mixing.

CAPACITY.—The diameter and the height of the silo will depend upon the number of animals to be fed and the number of days during which the feeding of ensilage occurs. The diameter should make it possible to feed at least a depth of 2" (and possibly 3") over the whole surface in order that the surface will not mould before it is fed to the stock.

CAPACITY OF SILOS IN TONS

Height Feet	Diameter			
	10'	12'	14'	16'
25	35	50	70	—
30	47	67	91	—
35	—	—	113	150

The above table serves as a guide only, and intermediate sizes are made, and their characteristics can be interpolated from the figures shown. For example, calculating at the rate of 40 lb. of silage per cow per day, and a herd of 30 cows, a suitable size would be a structure of 14' 6" diameter, with a height of 28', such a silo holding feed for 160 days.

FOUNDATIONS.—The silo is usually built 4'-5' below ground level, and in most cases a concrete floor is desirable and advisable. It is a good plan to provide for a drain at the centre of the floor, connected to a line of drain pipe, to carry off excess liquid, which, if allowed to accumulate in the silo, would greatly increase the pressure of the walls near the bottom. Where such a drain is installed, it must be covered with a screen at floor level to prevent silage from entering and choking the outlet.

CONCRETE.—Materials required for the concrete are sand, Portland cement, river gravel or crushed stone, and water. The sand should be clean and well graded.

5:2½:1 mixture is satisfactory for the foundation and floor.

4:2½:1 mixture is used for the wall.

REINFORCEMENT.—It is necessary to reinforce the concrete with steel. When silage has settled thoroughly in a silo it exerts considerable bursting pressure on the walls. The pressure increases towards the bottom of the structure, and, therefore, more reinforcement must be used at the bottom than near the top. Round steel rod, welded steel mesh, or even fencing wire can be used. The table on Sheet 4252B gives the spacing of horizontal rods. Vertical reinforcement is needed in all monolithic silos. This consists of ⅜" or ½" diameter steel rods spaced 30" apart, regardless of the size of the silo.

WALLS.—Walls of the silo are 5"—6" thick, and are poured between galvanized iron moulds. The corrugated appearance given to the outer surface is very pleasing. It is essential to the efficient settlement of the silage that the inside of the silo be smooth. This is obtained by facing the inside mould with flat galvanized sheet, and as rapidly as forms are raised, the inside wall face should be painted with a wash of cement and water mixed to cream consistency.

SILO DOORS.—Concrete silos may be equipped with either intermittent or continuous doorways. As either type is satisfactory, choice is largely a matter of individual preference.

The doors for both types are made of two layers of matched flooring, nailed to each other at right angles, with a layer of tarred paper between. 3' is a convenient length for an opening with a width of 24".

ROOF.—The roof must be securely fastened to the concrete walls to prevent severe windstorms from carrying it away, either by lifting the complete frame off or by tearing out the holding-down bolts. The roof is sheeted with 26g. 10 x 3" corrugations Red Orb or Red Zincanneal roofing sheets. A satisfactory framing is discussed in detail in Sheet 4352C.

CHUTE.—A chute is fastened to the silo wall to enclose the doorways. In many layouts with single silos and in those of twin silos where there is no vertical sheeting enclosing the space between the individual silos, this serves as a protection against the weather. In the main, however, the chute keeps the silage from scattering away when thrown down for feeding. For a single silo a convenient size is 2½' square (inside measurements), but most chutes are built in conjunction with twin silos. In this case the structures are a minimum of 5' apart, and the space between is enclosed to a width of 2½'.

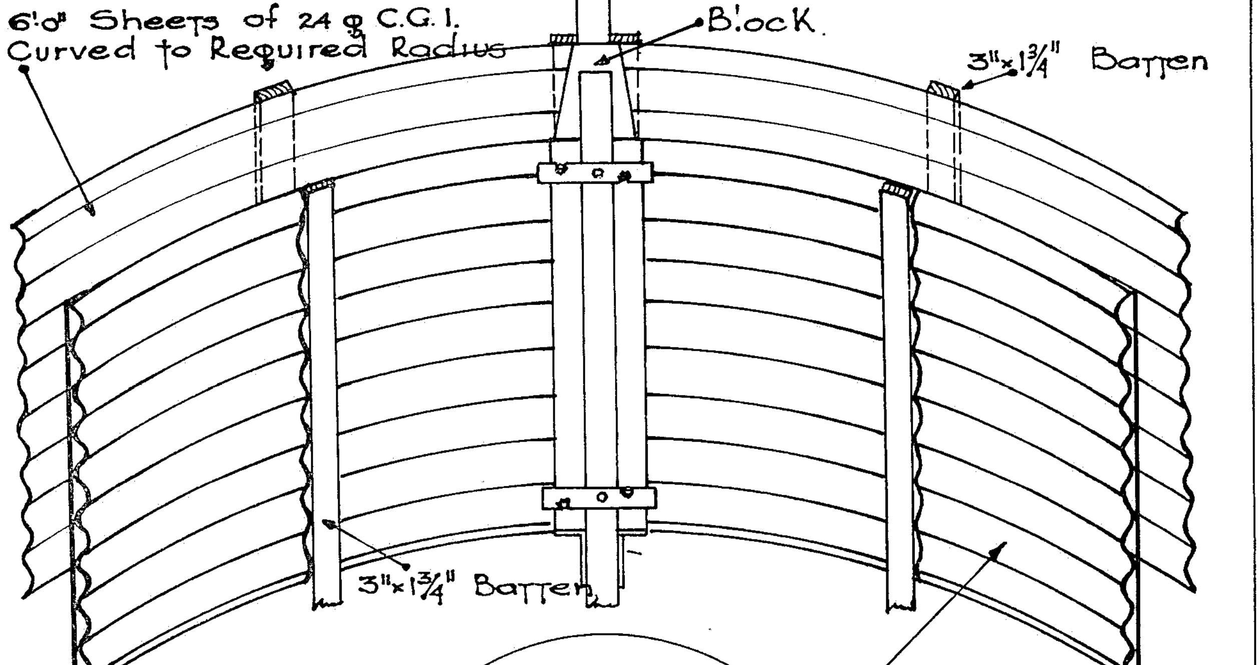
The chute is constructed of a light framework of 2" x 2" vertical and cross pieces, to which 26g. Red Orb sheets are fixed in such a manner that the timber framing is external to the lining. This chute is terminated some 7'-8' clear of the floor, and the concrete floor used as a mixing board.

LADDER.—A ladder extending from the ground to the top of the silo is necessary. It must be so placed that entry can be gained both to the top and to each of the doors to remove silage. This can be constructed of 3" x 2" side rails and 2" x ¾" rungs sunk flush with the rail and nailed. Alternatively, a ladder can be provided by setting U-shaped rungs of ½" steel bar in holes provided in the concrete.

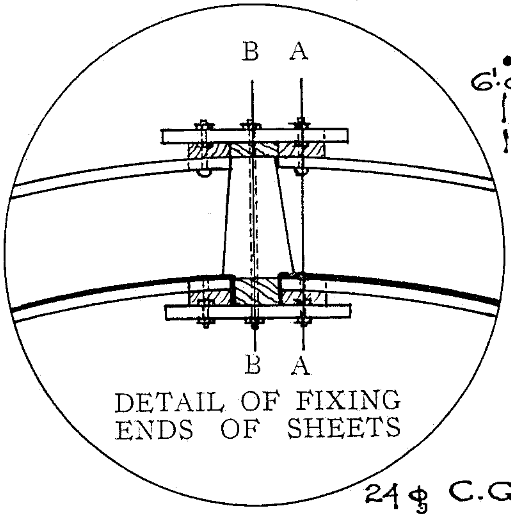
CUTTER AND ELEVATOR.—There are several good chaff cutters on the market, and it is not proposed to discuss their relative merits in these sheets. Connected with the cutter and silo is the elevator, as shown overleaf. The elevator proper consists broadly of an inclined trough, through which an endless link belt or chain passes. Attached to this chain are slats or bearers, which serve the same purpose as buckets in a grain elevator.

The elevator is contained in a large rectangular section structure framed up in 4" x 2" timbers and sheeted with Red Orb or Red Zincanneal sheeting.

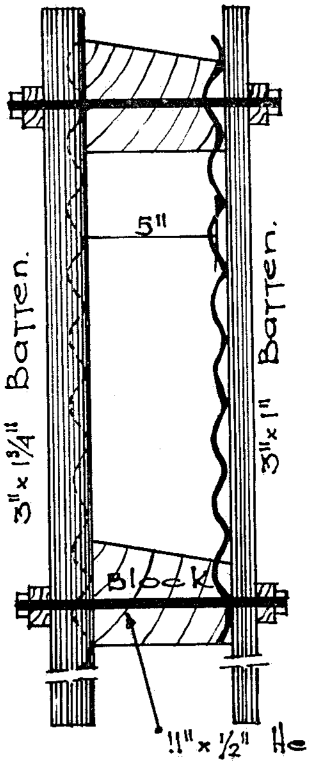
CORRUGATED IRON MOULDS FOR CONCRETE SILOS


6'0" Sheets of 24 g C.G.I. Curved to Required Radius
Block
3"x1¾" Batten
3"x1¾" Batten
6'0" Sheets of 24 g C.G.I. lined with 2 Plain Iron Curved to Req'd Radius

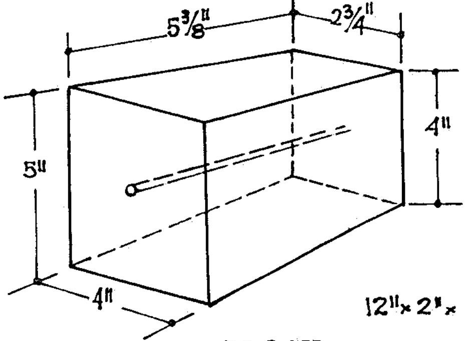
VIEW OF FORM WORK



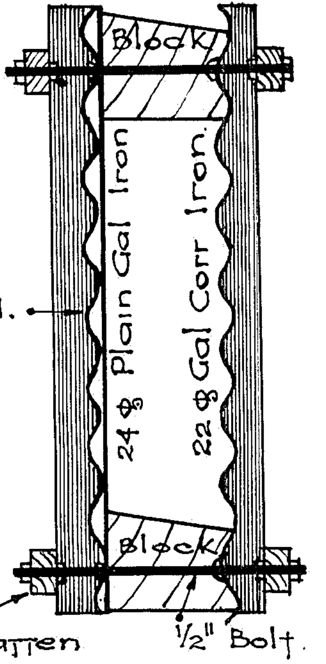
DETAIL OF FIXING ENDS OF SHEETS



SECTION B-B



BLOCK



SECTION A-A

DAIRY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4352B

CONSTRUCTION OF MONOLITHIC CONCRETE SILOS

CORRUGATED IRON MOULDS

GENERAL.—Efficient moulds are required for the casting of the cylinder of monolithic silos. The various corrugated galvanized iron silo moulds fit these requirements admirably, and illustrated overleaf is a typical set as recommended by the New South Wales Department of Agriculture.

INNER RING.—The inner ring in any set of moulds consists of 8 x 6', 24g., 8 x 3" corrugations Blue Orb sheets, trimmed to length and curved to a 7' 3" radius. This is lined with 6' x 30" x 24g. flat Queen's Head galvanized sheet to produce the necessary smooth surface on the interior of the silo. Sheets are riveted together, holes being punched from the inside of the lining. Bolted to the ends of each sheet are 3" x 1$\frac{3}{4}$" battens. These are notched to fit the standard corrugation, and are fixed to the sheets with $\frac{3}{8}$" diameter bolts.

OUTER RING.—The outer ring in any set of moulds consists of 8 x 6', 22g., 8 x 3" corrugations Blue Orb sheets, trimmed to length and curved to 7' 8" radius. To the ends of each length of sheet are fastened hardwood battens cut from 3" x 1$\frac{3}{4}$" hardwood timbers. These are cut to fit the standard corrugations, and are fixed to the sheet with $\frac{3}{8}$" diameter bolts. These bolts are 3" long, and threaded 2" to take two nuts, one for use with galvanized sheets, the other for assembling moulds together.

GUIDES.- For erecting, a guide is provided in the centre of each sheet, externally to the side on which the concrete is being poured. These consist of 3" x 1$\frac{3}{4}$" battens recessed to fit the corrugation of the galvanized iron (and of the concrete already poured in the silo). These latter guides project 12" below the bottom edge of the moulds, and are fastened through the sheets by two $\frac{1}{2}$" bolts, which serve also as spacers.

JOINTING.—When the moulds are assembled, timber pieces as described below are used to facilitate stripping and assembling. A timber spacer of 3" x 1" separates the edges of the outer moulds, while the 3" x 2" spacer separate edges of the inner moulds. These pieces are separated by a putlog block top and bottom, the whole being joined by $\frac{1}{2}$" bolts. A keeper is used, top and bottom, with each spacer. This is a 3" x 1" keeper, and is notched to clamp over the projecting $\frac{3}{8}$" bolts of the end battens of the inner and outer moulds.

PUTLOG BLOCKS.—At each mould joint, top and bottom, is a wooden block, used in conjunction with the moulds, not only as a separate piece, but to form holes in the walls for putlogs in the erection of the silo.

FORMS FOR DOORWAYS.—Concrete silos may be equipped with two types of doorways, intermittent and continuous. Formwork is used according to the type selected, and fastened to the inner mould.

SPACING OF HORIZONTAL REINFORCING ROD IN INCHES

Distance in feet down from top of Silo	Diameter in Feet				
	10	12	14	16	18
	$\frac{3}{8}$" dia. Rod	$\frac{3}{8}$" dia. Rod	$\frac{1}{2}$" dia. Rod	$\frac{1}{2}$" dia. Rod	$\frac{1}{2}$" dia. Rod
Top 5'	24	24	24	24	24
,, 5'-10'	24	24	24	24	24
,, 10'-15'	24	18	24	24	24
,, 15'-20'	18	16	24	18	18
,, 20'-25'	16	12	18	16	14
,, 25'-30'	14	10	16	14	12
,, 30'-35'	12	9	14	12	10
,, 35'-40'	10	8	12	10	9

SILO CONSTRUCTION

GENERAL.—Where the services of a reliable contractor can be secured, it is generally desirable to have the silo built under contract.

FOOTINGS.—The footings and the concrete floor are poured in one operation. Having completed the excavation, drive in pegs around the floor of the excavated ring to stand 12" out of the ground (depth of the footings), and to be level. Mix a batch of concrete for the foundation, using the mixture specified. Having placed the reinforcement (radiating steel bars and verticals at 30" centres) wet the ground and pour the concrete to the level of the top of the pegs.

After floor and footings have been in place 24 hours, the walls may be commenced while the concrete is still green. Apply a paint of cement and water mixed to the consistency of cream to help secure a good bond and tight joint where wall and footing meet.

SCAFFOLDING.—An important item in the construction of a silo is a cheap but suitable scaffolding. For the silo described in these sheets most of the scaffolding is carried out with the roofing timbers. The system is simple and perfectly safe. It consists of a central mast of two 16' lengths of 4" x 4" hardwood, used later as diagonal plates of the roof. To this mast secure a clamp constructed of short lengths of timber bolts and washers, screwed up tightly and additionally secured underneath by lightly nailed cleats.

On this clamp rest the putlogs or radiating bars (to be used later as rafters). The other ends of these timbers project through the silo walls to form an outer scaffold.

To complete the scaffold, it is necessary to use five 8' lengths and 16 6' lengths of 1$\frac{1}{2}$" x 12" wide oregon planking.

SILO WALLS.—For constructing the walls:—

1. The forms must be set.
2. Reinforcement must be placed in position.
3. Provision made for the openings for doors, plugs for ladders, downpipes, etc.

The moulds having been set up, the concrete is placed into position, being well rammed while the pouring is proceeding. The moulds will require scraping and whitewashing (or greasing with fat) each time they are taken down. Any holes or rough surfaces which show in spite of these precautions should be ultimately filled and floated over with mortar composed of one part cement and two parts sand.

When finishing off walls, provision is made in the last lift for an additional 8" depth of concrete to be poured, on which rest the bearer plates for roof construction, and for the setting in the wall of anchor bolts at 3' centres, two per bearer. Proceed to erect the roof, the construction of which is as listed in Sheet 2532C.

CONCRETE QUANTITIES FOR MONOLITHIC SILOS

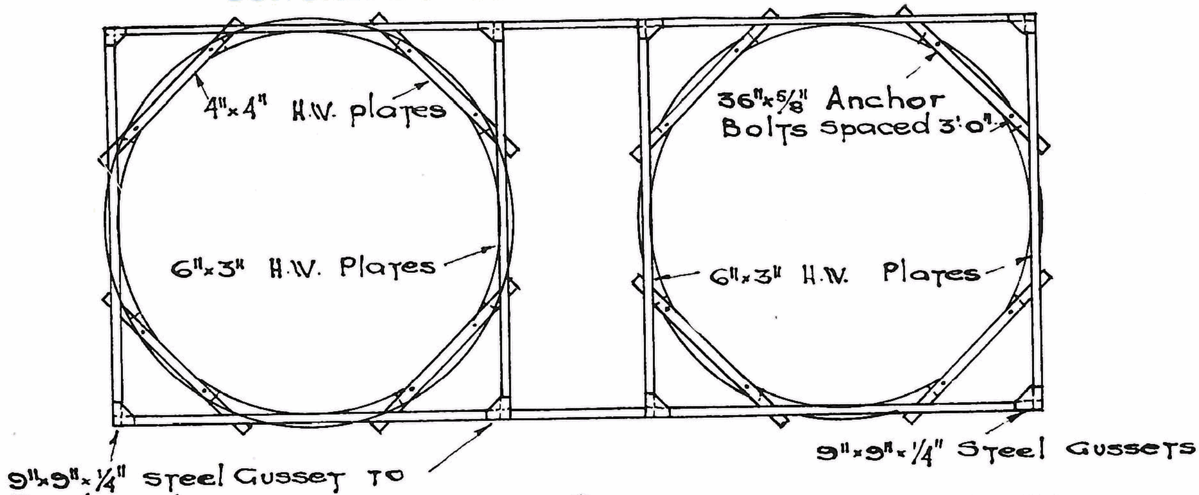
Inside dia. Ft.	Silo 30' high			Each additional 5' in height		
	Cement Paper Bags	Sand Cu. Yds.	Aggregate Cu. Yds.	Cement Paper Bags	Sand Cu. Yds.	Aggregate Cu. Yds.
10	116	11	18	16.0	1.5	2.4
12	140	13	21.5	19.2	1.8	2.9
14	164	15	25	22.5	2.1	3.4
16	188	17.3	28.7	25.7	2.4	3.8
18	212	19.6	32.6	29.0	2.7	4.3

DAIRY SECTION

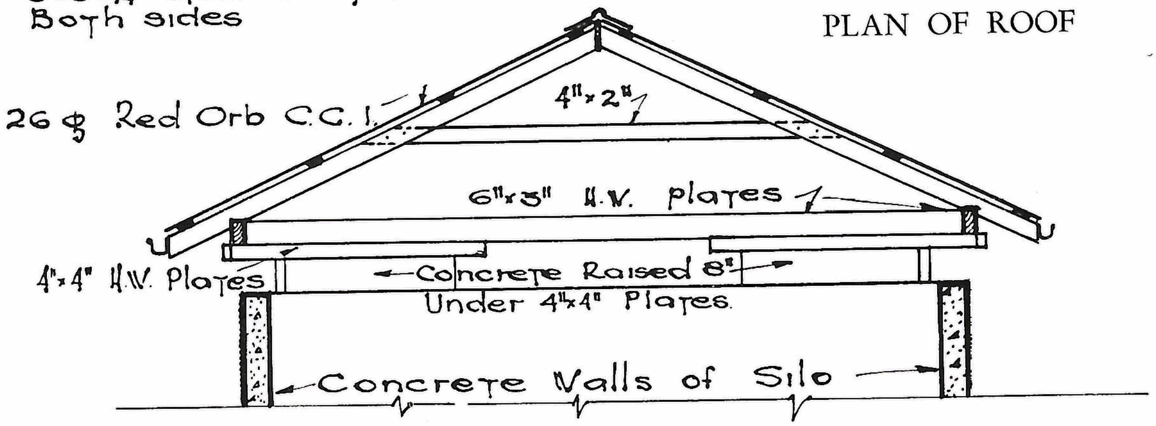
LYSAGHT'S COUNTRY SERVICE

SHEET 4352C

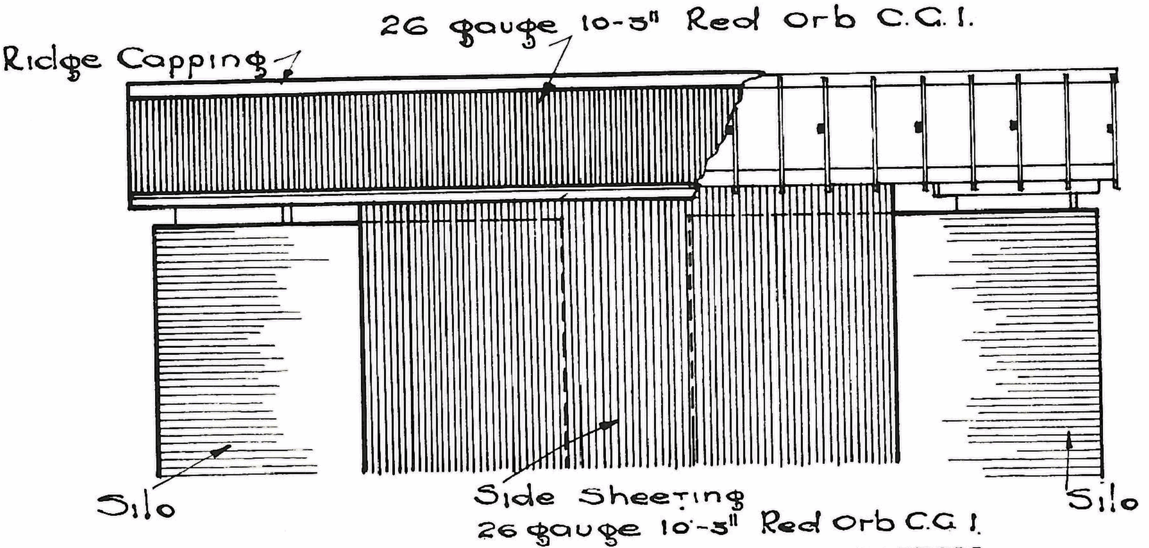
CONCRETE SILOS — ROOF CONSTRUCTION



PLAN OF ROOF



SECTION THROUGH ROOF FRAMING


26 gauge 10-3" Red orb C.G.I.
Ridge Capping
Silo
Side Sheeting 26 gauge 10'-3" Red orb C.G.I.
Silo

PART SIDE ELEVATION

DAIRY SECTION

LYSAGHT'S
COUNTRY SERVICE

SHEET 4352C

CONCRETE SILOS — ROOF CONSTRUCTION

GENERAL.—Roofs of all silos must be securely fastened to the concrete walls to prevent severe windstorms from carrying away the structures, either by lifting off the complete frame or tearing the holding-down bolts from the concrete. At the same time, it is advisable to raise it fairly high at the eaves (where the roof takes its bearing on the wall plates) to facilitate working when trampling the chaff during filling. To obtain increased height, the concrete walls under the bearer plates are carried up 8" above the rest of the work. The sketch overleaf illustrates roof framing for twin 10' diameter concrete silos.

ROOF FRAMING.—The roof structure is framed up as under:—

4" x 4" hardwood bearer plates, 8' long, bolted to the concrete, two $\frac{3}{8}$" diameter bolts per bearer, 36" long, set in the concrete. (These plates are cut from 16' lengths of timber previously used as a central mast of the scaffolding used in the erection.)

6" x 3" hardwood plates are set across and bolted to the bearers with $\frac{3}{8}$" cup-headed bolts and washers. Of the various means of joining 6" x 3" plates together, the most rigid is to butt joint the members and secure with 9" x 9" x $\frac{1}{4}$" steel gusset plates, drilled to take $\frac{1}{2}$" bolts, two to each member.

4" x 2" rafters at 3' centres are bird's-mouthed over the plate to give 18" overhang of roof, and are fixed to a 6" x 1" ridge board. Gable ends project 18" beyond silo walls.

3" x $1\frac{1}{2}$" battens, maximum 4' centres, carry the roof sheeting.

4" x 2" collar ties are provided, one to every second rafter.

3" x $1\frac{1}{2}$" diagonal braces are nailed to the underside of the rafters.

4" x 2" timbers are used to frame up the gable ends and carry the vertical sheeting.

Barge board, ridge board, and fascia are to be 6" x 1" timbers.

With the exception of the plates, which are to be hardwood, all other timbers may be hardwood or cypress pine.

ROOFING.—The roofing is to be covered with 12' lengths of 26g. Red Orb 10 x 3" corrugations galvanized iron, or Red Zincanneal roofing sheets. These are to be fixed with a side lap of one and a half corrugations and a minimum end lap of 6". Sheets span two battens spacing, and are secured with galvanized screws and washers, pierced through the top of every second corrugation at end laps and every fourth corrugation at intermediate points. The gable rake may be finished by the normal rolled edge to the end sheet, over the barge board, or by bending down two or three corrugations over the barge board and fastening at 2' centres with galvanized screws and washers.

GABLE SHEETING.—The end gables are to be sheeted with 6' lengths of 26g. 10 x 3" corrugations Red Orb galvanized sheet or Red Zincanneal, fixed with side laps of one corrugation and end laps of 4". Sheets are mitre-cut as required. Sheets are to be fixed to nogging pieces or girts with galvanized screws and washers, pierced through the top of every second corrugation at end laps of sheets and every fourth corrugation at intermediate points.

RIDGE CAPPING.—Ridge capping shall be of 24g. Queen's Head galvanized iron or Zincanneal sheet, formed from 18" wide strips and 6' or 8' lengths as available. Ridge capping is to be lapped 6" and securely fixed in conjunction with roofing sheets, galvanized screws, and lead washers, or alternatively, spring-headed roofing nails. Ridge capping is to be well dressed down into the corrugations.

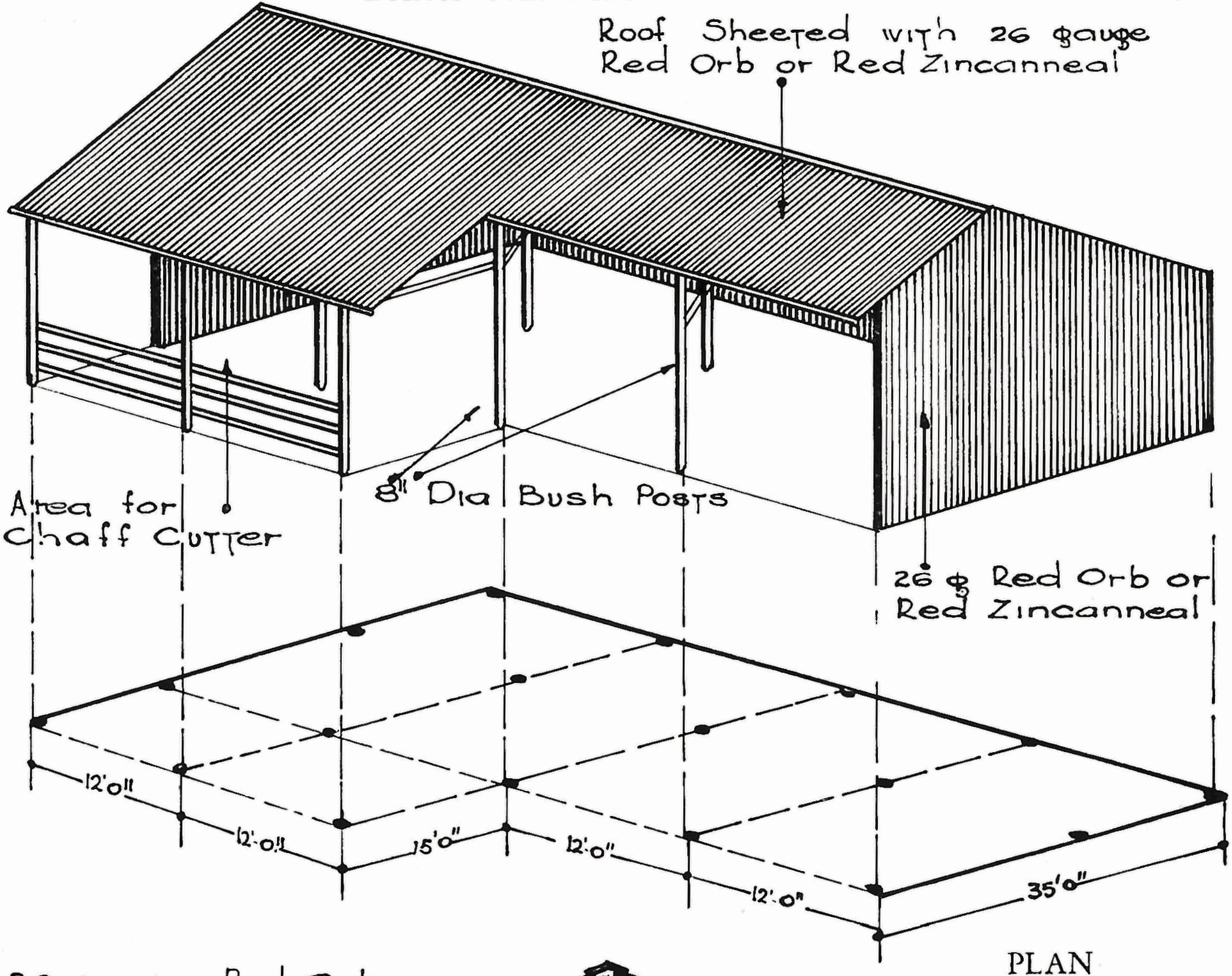
EAVES GUTTERS.—Eaves gutters are to be 5" 24g. beaded-edge quadrant type, formed from 6' or 8' lengths of Queen's Head or Zincanneal R.L. sheets, lapped, double riveted, soldered at joints, and fixed in position with the required falls to downpiping. Gutters are secured to rafters with 16g. galvanized brackets, screwed with a pair of screws. Cut gutters to receive thimble connections of downpipes, properly soldered at these junctions. Provide galvanized wire gratings to all downpipe outlets. Properly construct all stop ends and mitres.

DOWNPIPES.—Provide and fix where necessary 24g. 3" diameter round galvanized iron or Zincanneal R.L. rain water pipes, 6' or 8' lengths, well entered and soldered at joints, and complete with all necessary bends, elbows, and junctions. Downpipes are fastened to the concrete walls with brackets nailed to wooden plugs. Downpipes are fixed to brackets with self-tapping screws. Plugs are set in the concrete wall during erection (a handy position is in the blocks which fill the putlog holes). Advantage should be taken of the area of the roof provided for rain catchment, and the water stored in corrugated iron tanks.

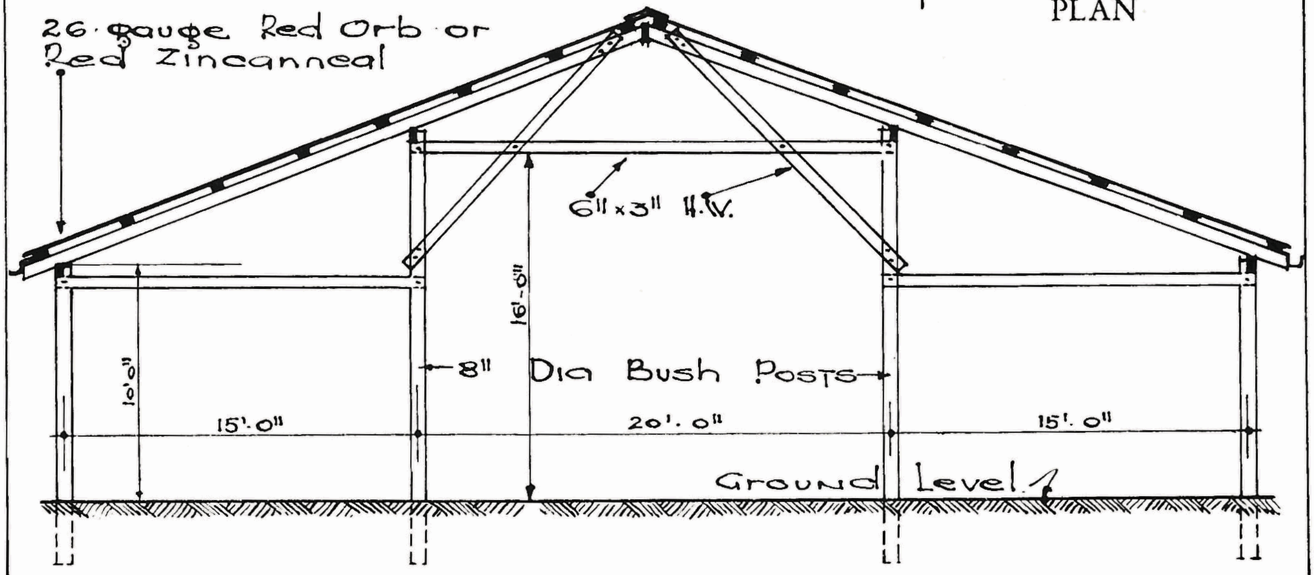
PAINTING.—A galvanized iron roof will last longer if the end and side laps of the sheets are painted before fixing with any good quality roof paint. The points of contact are where corrosion usually begins. It is a distinct advantage to paint the underside of capping and end sheets as a preventative against corrosion from the effects of fodder conservation.

LYSAGHT
ORB
AUSTRALIA

DAIRY PREMISES — HAY SHED



PLAN



CROSS SECTION

DAIRY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4356

DAIRY PREMISES — HAY SHED

GENERAL.— A variety of designs exist for hay sheds on dairy farms, and the type selected must depend not only on the quantity of fodder to be stored or to be chopped up for silage, but on the climatic conditions. In relatively dry areas, protected from driving rains, the shed may be open on all sides, but in wet coastal regions, the type illustrated overleaf is favoured, sheeted in on three sides according to the direction from which prevailing weather occurs. Any difficulty in filling is repaid by saving on quantity of fodder stored. In many areas the same design as illustrated can be used, but with the rear wall removed.

The chaff-cutting shed can be a separate building as an annexe, or the continuation of the roof of the hay shed to form a lean-to.

The framework consists of cypress pine or hardwood, carried on round bush timber posts. The distance between centres of posts is 12', and the structure can be increased by any multiple of 12' as desired.

FLOOR.— The floor is of earth, built up 6"-12" above the ground level and well consolidated.

POSTS.— Posts supporting the roof framing are to be of bush timber, not less than 8" diameter at the small end, and set a minimum of 4' in the ground. They should preferably be potted in a concrete blob footing 18" dia. x 4' 6" deep. The portion set in the ground, and 2' above ground level, is to be coated with creosote or a heavy coat of hot tar. Tops of posts are to be scarfed out to take 6" x 3" top plates and transverse ties, posts being holed for ½" dia. bolts. Posts should be free of bark before erection.

ROOF FRAMING.— The roof is to be framed up with:—

Rafters at 3' 0" centres	4" x 2"
Plates	6" x 3"
Ridge Board	6" x 1"
Battens	3" x 1½"
Braces and Ties	4" x 2"
Diagonal Bracing under Rafters	3" x 1"

Rafters are to be bird's-mouthed over all plates and strapped with 16g. galvanized strapping.

WALL FRAMING.— The wall sheeting is carried on 4" x 2" girts, checked into vertical posts and intermediate 4" x 4" studs at 4' centres.

ROOF SHEETING.— The roof is to be sheeted with 12' and 9' lengths of 26g. 10 x 3" corrugations Red Orb or Red Zincanneal sheet, fixed with a side lap of 1½ corrugations and an end lap of 6". Sheets are nailed to battens with spring-headed nails, pierced through the top of every second corrugation at the ends and every fourth corrugation at intermediate battens.

WALL SHEETING.— The walls are to be sheeted with 12' and 9' lengths of 26g. 10 x 3" corrugations Red Orb or Red Zincanneal sheet, fixed with a side lap of one corrugation, and, where applicable, an end lap of 4". Sheets are fixed with spring-headed nails, pierced through the top of every second corrugation at ends of sheets, and every fourth corrugation at intermediate battens.

RIDGE CAPPING.— Ridge capping is to be formed from 18" wide strips of 24g. Queen's Head galvanized sheet or Zincanneal sheet in 6' or 8' lengths. Ridging is lapped a minimum of 6" at the joints and securely fixed in position in conjunction with the roofing sheets.

EAVES GUTTERS.— Eaves gutters are to be of the 5" beaded-edge quadrant type, formed from 6' or 8' lengths of Queen's Head galvanized or Zincanneal sheet. These are end lapped 1½", double riveted and soldered over the full width of lap, fixed with the required falls to outlets, and secured to rafters with 16g. galvanized brackets. Gutters are cut to receive thimble connections of downpipes, and properly soldered at these junctions.

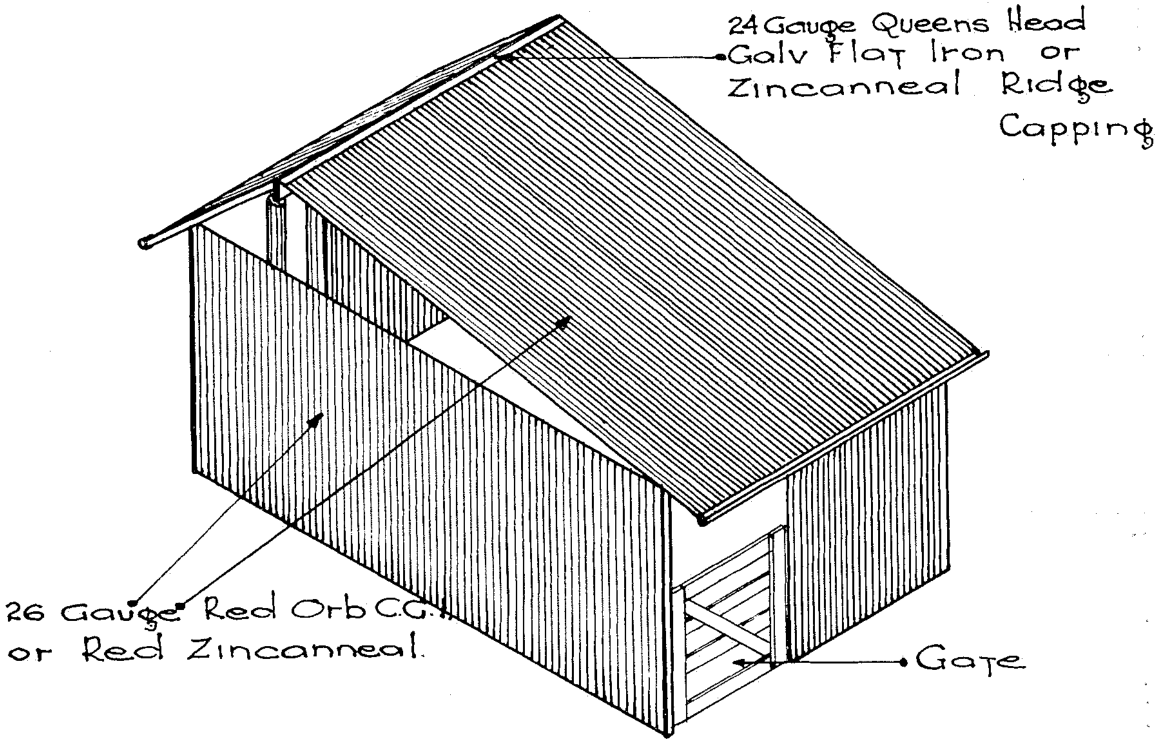
DOWNPIPES.— Provide and fix 24g. 3" diameter downpiping of Queen's Head galvanized or Zincanneal sheet, formed in 6' or 8' lengths. Water is carried away to storage or sumps as required. Wherever possible, water should be stored for hosing down the yards.

CHAFF-CUTTER ANNEXE.— Provide suitable concrete block for chaff-cutter annexe and footings for elevator to carry silage to silos.

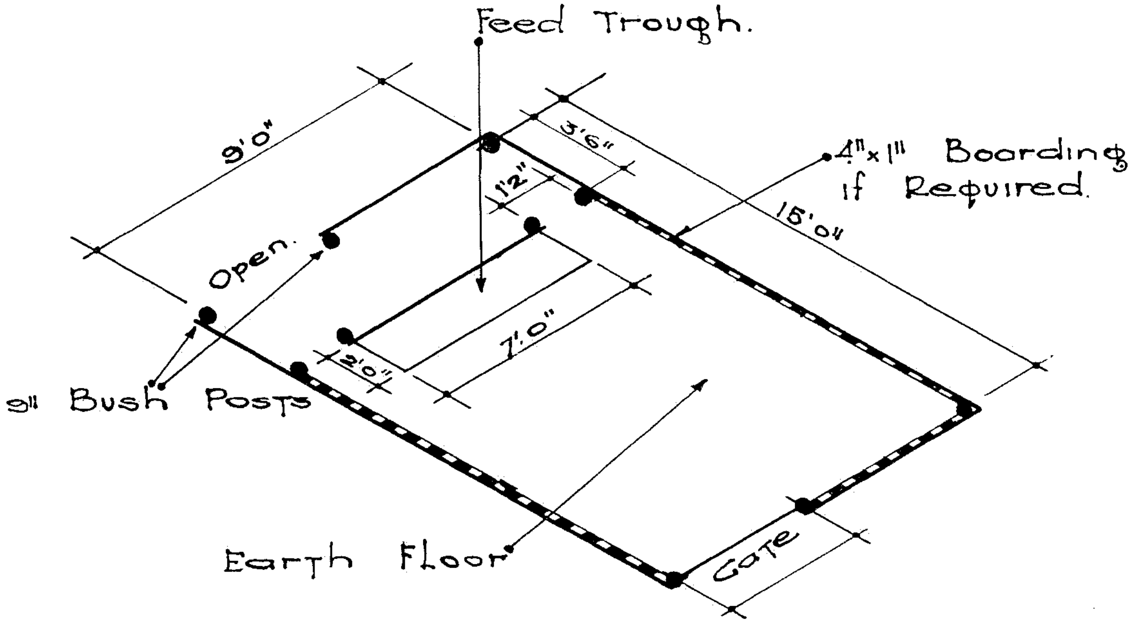
ELEVATOR.— Where the hay shed is used in conjunction with an elevator the chaff-cutter lean-to is to be suitably adapted to take the elevator boxing. The joint between roofing and the elevator box sheeting is to be flashed with 24g. Queen's Head galvanized or Zincanneal sheet, turned up under vertical sheeting a minimum of 9". Provide a small apron gutter to discharge the water.

LYSAGHT
ORB
AUSTRALIA

BULL SHED



ISOMETRIC VIEW



PLAN

DAIRY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4362

BULL SHED

GENERAL.—For good care of the bull, a bull shed is indispensable. The structure need not be elaborate, and costs very little to erect. A typical structure is illustrated overleaf.

FLOOR.—The floor is of earth, well rammed and built up 6"-12" above the natural ground level, sloping from the manger to the entrance 1" in 12'. A quick-sloping earth apron some 2'-3' wide surrounding the structure brings the floor level to that of the surrounding country.

POSTS.—Posts supporting the roof framing are to be 9" dia. bush timber (not less than 6" dia. at the small end), and set a minimum of 3' into the ground. They should be preferably potted in a concrete blob footing some 18" in diameter. The portion set in the ground and 2' above ground level is to be coated with creosote or a heavy coat of hot tar. Tops of posts are to be scarfed out to take 4" x 2" plates, sides to be halved for checking in 4" x 2" girts.

ROOF FRAMING.—The roof is to be framed up in 4" x 2" rafters, bird's-mouthed over 4" x 2" ridge plates. Wall plates are checked into wall posts and nailed, ridge plate sets squarely on central posts and is doubly nailed to each post. Roof sheeting is fixed to 3" x 1½" battens, spacing not to exceed 5'.

WALL FRAMING.—Side sheeting is fixed to 4" x 2" girts checked into vertical posts.

ROOF SHEETING.—The roof is sheeted with 7' and 5' lengths of 26g. 10 x 3" corrugations Red Orb or Red Zincanneal sheet, fixed with a side lap of 1½ corrugations and an end lap of 6". Sheets are nailed to battens with spring-headed roofing nails pierced through the top of every second corrugation at ends and laps, and every fourth corrugation at intermediate battens.

WALL SHEETING.—Walls are sheeted with 7' lengths of 26g. 10 x 3" corrugations Red Orb or Red Zincanneal sheet, fixed with a side lap of one corrugation and, where applicable, an end lap of 4". Sheets are fixed with spring-headed nails pierced through the top of every second corrugation at ends of sheets and every fourth corrugation at intermediate battens.

RIDGE CAPPING.—Ridge capping is to be formed of 18" wide strips of 24g. Queen's Head galvanized sheet or Zincanneal, in 6' or 8' lengths.

EAVES GUTTERS.—Eaves gutters are to be of the 4" beaded-edge quadrant type, formed from 6' or 8' lengths of Queen's Head galvanized sheet or Zincanneal. These are end lapped 1½", double riveted, and soldered over the full width of laps—fixed with required falls to outlets and secured to rafters with 16g. galvanized brackets.

DOWNPIPES.—Provide and fix 24g. 2" downpipe of Queen's Head galvanized sheet or Zincanneal, 6' or 8' lengths. Water discharges into sumps, and is carried away via rubble drains. It is very convenient to discharge the water into small 200- to 400-gallon tanks, which serve as a source of drinking water for the bull.

FEED TROUGH.—The feed trough is framed up in timber to suit the requirements of the individual owner, but the actual feed should be placed in a receptacle formed from Queen's Head galvanized sheets. This receptacle should be loose and capable of being taken out and cleaned down as required.

GATE.—Provide a gate formed from 4" x 1" and 3" x 1" timbers and fitted to the shed with the necessary fittings.

LINING.—If considered necessary, the inside of the shed can be lined with 4" x 1" timbers, with a gap of 1" in between members.

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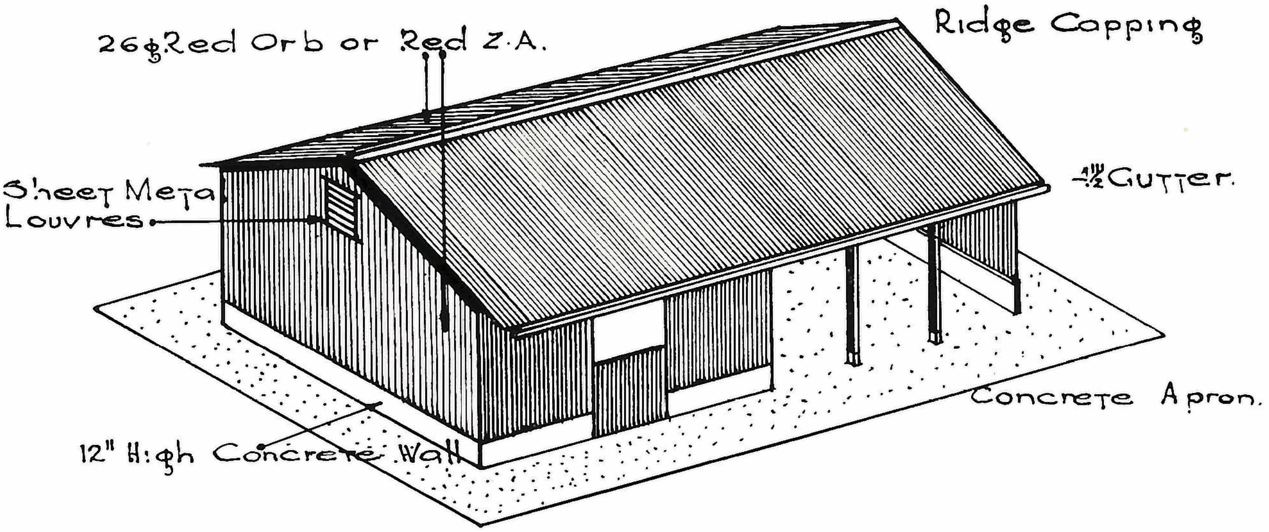
DAIRY SECTION

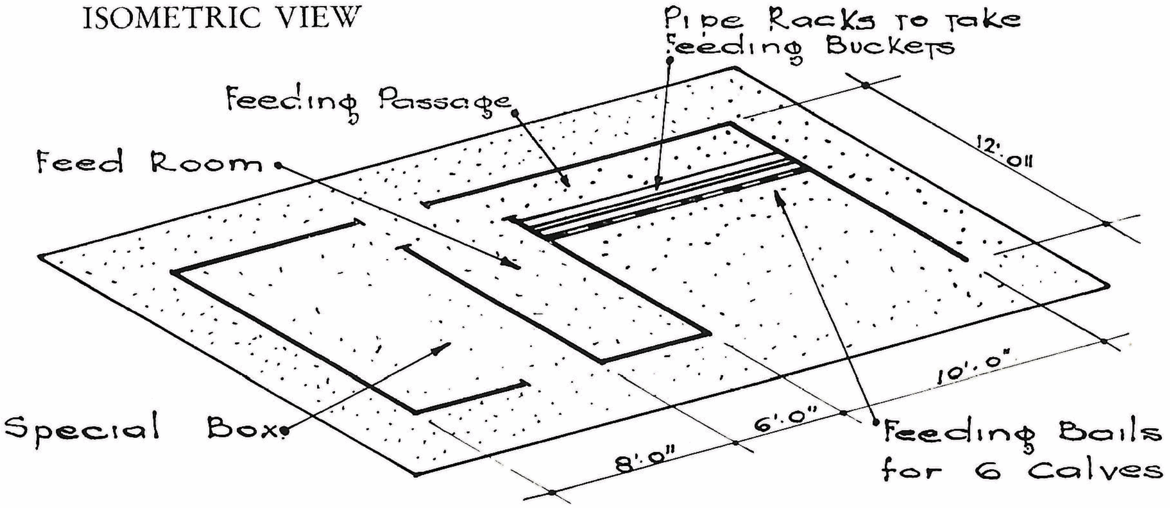
LYSAGHT'S COUNTRY SERVICE

SHEET 4365

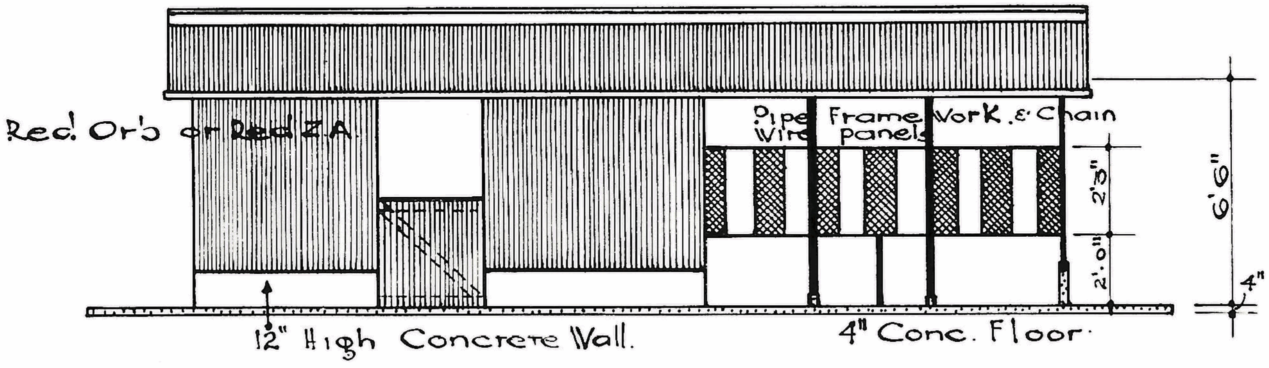
CALF FEEDING BAILS



ISOMETRIC VIEW


Pipe Racks to take Feeding Buckets
Feeding Passage
Feed Room
12'.0"
10'.0"
6'.0"
8'.0"
Special Box
Feeding Bails for 6 Calves

PLAN



FRONT ELEVATION

DAIRY SECTION

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CALF FEEDING BAILS

GENERAL.—It is usual to provide calf feeding bails in dairy premises of any size. The structure illustrated overleaf allows of simultaneously feeding six calves. Associated with the calf feeding bails are the central feeding room and special box for any calf requiring preferential treatment.

FLOORS AND DRAINS.—The floors and drains are to be of 5:3:1 concrete at least 4" thick, cement rendered and graded 1" in 12' to the entrance of the structure. A 3' wide concrete apron with 4" kerb is provided all around the structure. Though this apron is not essential it is a distinct advantage from the cleanliness point of view. The floor of the feed room and isolation box are so graded as to allow of cleaning and hosing out washings through the respective openings. On one side provide a wide shallow drain to carry all washings away to a distance of at least 30 yards from the bails.

DWARF WALLS.—Wall framing on the perimeter of the structure is to be fixed on a concrete dwarf wall of a minimum height of 12" above floor level. All intersections of concrete walls with the floor should be coved to avoid accumulation of dirt at the angles. ½" diameter bolts used to fasten wall plates to the concrete dwarf walls must be embedded in the concrete to a depth of not less than 3".

DIVISION WALLS.—Division walls 3' 9" high and 4" minimum thickness are to be provided between the feed room and the feeding bails.

POSTS.—Posts are to be 4" x 4" timber set on concrete blocks 6" above the level of the floor and fixed to them by a steel rod dowel. These dowels should be set a depth of 3" below floor surface. All intersections of blocks with the floor should be rounded to avoid accumulation of dirt at the angles.

WALL FRAMING.—The wall height at the eaves is 6' 6" minimum clearance and the length of the side wall framing members is arranged to meet this requirement. Walls are framed up in:—

4" x 4" corner posts.
4" x 2" intermediate studs.
4" x 2" top and bottom plates.
3" x 2" noggings to carry the wall sheeting.

ROOF FRAMING.—Roof framing is arranged to carry 8' lengths of corrugated galvanized iron. Frame up in:—

Hardwood or cypress rafters	4" x 2"
Battens	3" x 1½"
Ridging and barge boards	6" x 1"

ROOFING.—The roofing is to be sheeted with 8' lengths of 26g. 10 x 3" corrugations Red Orb or Red Zincanneal sheet, fixed with a side lap of 1½ corrugations and an end lap of 6". Sheets are nailed to battens with spring-headed nails, pierced through the top of every second corrugation at the ends and every fourth corrugation at intermediate battens.

WALL SHEETING.—The walls are to be sheeted with 6' lengths of 26g. 10 x 3" corrugations Red Orb or Red Zincanneal sheet, fixed with a side lap of one corrugation and an end lap of 4". Sheets are nailed to noggings and plates with spring-headed nails, pierced through the top of every second corrugation at the ends and every fourth corrugation at intermediate battens.

RIDGE CAPPING.—Ridge capping is to be formed from 18" wide strips of 24g. "Queen's Head" galvanized sheet or Zincanneal sheet in 6' or 8' lengths. Ridging is lapped a minimum of 6" at the joints and securely fixed in position in conjunction with the roofing sheets.

EAVES GUTTERS.—Eaves gutters are to be 4" 24g. beaded-edge quadrant type, formed from 6' or 8' lengths of "Queen's Head" galvanized sheet or Zincanneal. These are end lapped 1½", double riveted and soldered over the full width of lap—fixed with the required falls to outlets and secured to rafters with 16g. galvanized brackets. Gutters are cut to receive thimble connections of downpipes, and properly soldered at these junctions.

DOWNPIPES.—Provide and fix 24g. 3" diameter downpiping of "Queen's Head" galvanized or Zincanneal sheet formed in 6' or 8' lengths. Water is carried away to storage or sumps as required. Wherever possible water should be stored for hosing down the yards.

BAIL DIVISION.—Bail divisions are made to detail with ¾" galvanized pipe frames and chain wire panels.

FEEDING RACKS.—The feeding rack is made of 1¼" diameter galvanized pipes.

DOORS.—Doors are to be of a half-height stable type, framed, braced, and sheeted with corrugated galvanized iron. Junction with the floor and door posts is to be carefully executed in order that openings to feed room are vermin-proof.

LOUVRES.—Instal sheet metal louvres in gable end of special box.

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DAIRY SECTION

LYSAGHT'S
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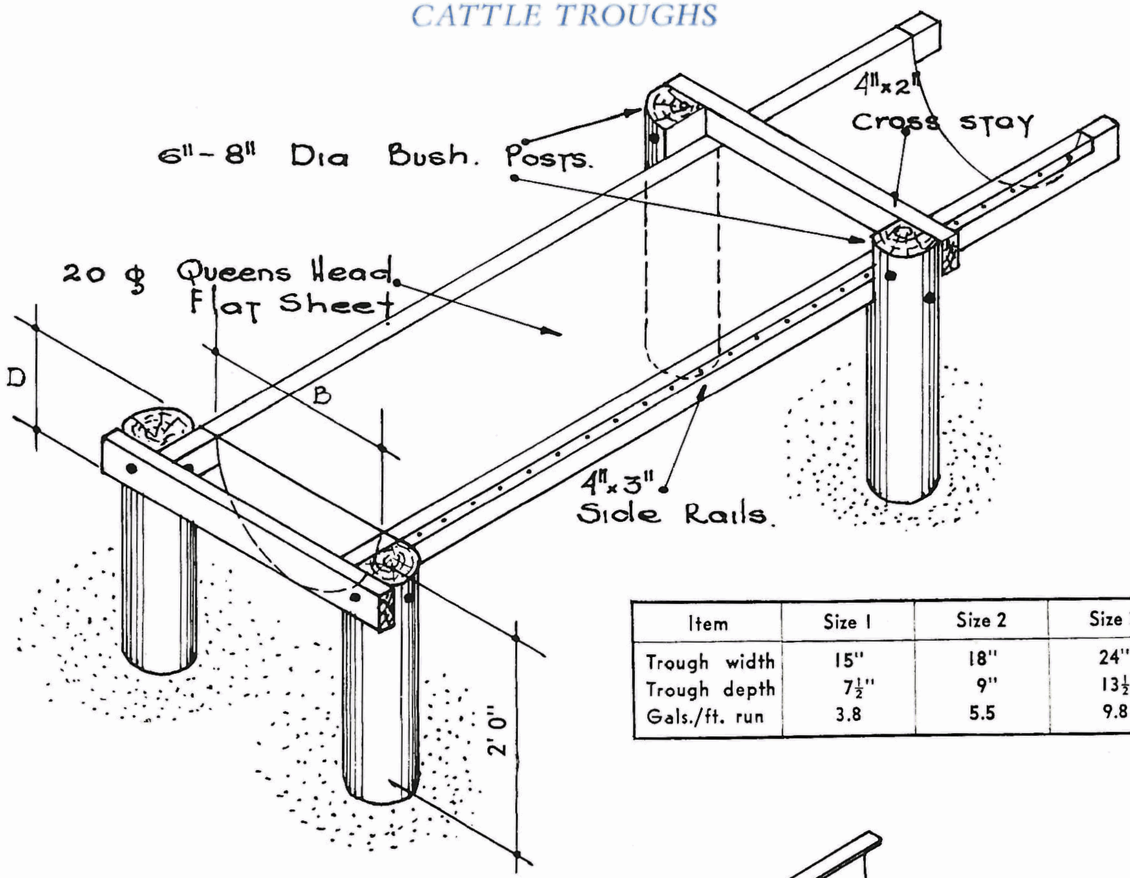
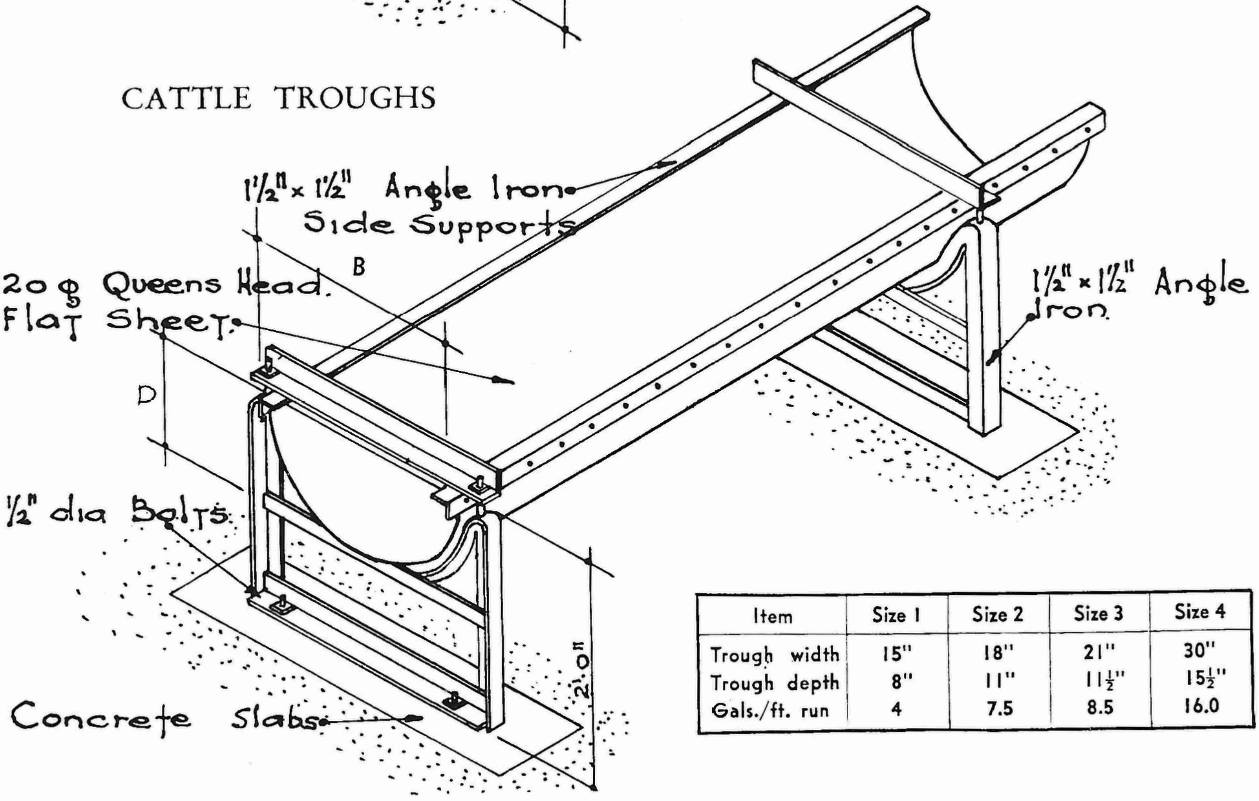
CATTLE TROUGHS



Item	Size 1	Size 2	Size 3
Trough width	15"	18"	24"
Trough depth	7½"	9"	13½"
Gals./ft. run	3.8	5.5	9.8

CATTLE TROUGHS


1½" x 1½" Angle Iron Side Supports
B
20 g Queens Head. Flat Sheet.
D
1½" x 1½" Angle Iron
½" dia Bolts.
Concrete Slabs
2'0"

Item	Size 1	Size 2	Size 3	Size 4
Trough width	15"	18"	21"	30"
Trough depth	8"	11"	11½"	15½"
Gals./ft. run	4	7.5	8.5	16.0

DAIRY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4392

CATTLE TROUGHS

TIMBER FRAMEWORK

GENERAL.—Cattle troughs are invariably made of galvanized sheet steel, fitted to a suitably designed timber or steel framework, and equipped with the necessary fittings for replenishing and emptying the trough.

The method of attachment can be varied considerably. The sheets can either be folded over the side rails, as illustrated, or fixed to the inside of the side rails, as is the practice with the commercial prefabricated units.

SIZE.—Established practice is to build troughs from the comprehensive range of standard widths, supplied by Lysaght's in their "Queen's Head" or Zincanneal flat sheets. These are supplied in widths of 24", 30", 36", and 48", lengths 6'-8'. Dependent on the method of attachment, i.e., the amount of material folded over the side rails, so the capacity of the troughing varies for any particular width of sheet. The gauge of sheet used varies with the size of trough, as shown in the table below.

FRAMEWORK.—The simplest type of timber framework is that shown overleaf and consists of:—

6" — 8" diameter posts.
4" x 3" side rails.
4" x 2" cross stays.

The posts are sunk 18"-24" into the ground, that portion in the ground being treated with Creosote or other white ant deterrent compound before setting in place. Tops of the posts are scarfed to take the top cross stays and side rails. The framework is to be bolted together with ⅜" diameter cup-headed timber bolts, with nuts and square washers. Posts are to be sawn flush with the top of cross stays, after assembly of the trough.

TROUGH BODY.—The trough body is of a suitable gauge Zincanneal or "Queen's Head" flat sheet, this being bent by hand to the required curvature and hammered over the side rails to the desired shape. End pieces are marked out to the required radius, and cuts made to form a number of serrations, ready for bending. After bending, the end pieces are fitted to the trough body, riveted at every second serration, and soldered. Lengths of troughing are lapped 1½" and riveted with tinmen's rivets at 3" centres, and soldered. The troughing is then ready for fitting to the framework, being nailed in place with 1" galvanized clouts.

FITTINGS.—The trough should be fitted with:—

Entry pipe and ball cock valve.
Ball cock valve cover.
Cleaning plug.

Ball cock valve covers can be purchased to fit all the sized troughs mentioned in the table below; alternatively, these can be made of flat galvanized 14g. sheet, curved to shape, and braced with flat iron brackets.

NOTE.—(1) The ground surrounding the trough should be well drained, and, if possible, paved with flat stone, as shown, or concreted.

(2) If the water used is bore water, or water from any corrosive source, then it is advisable to paint the inside of the trough with a protective paint. A suitable mixture is one of cement, linseed oil, and terebine.

TROUGH SIZES

Item	Size 1	Size 2	Size 3
Trough width—B ..	15"	18"	24"
Trough depth—D ..	7½"	9"	13½"
Gals./ft. run	3.8	5.5	9.8
Size of sheet used ..	30"	36"	48"
Gauge of sheet used	24, 22	22, 20	16, 14

STEEL FRAMEWORK

GENERAL.—Standard practice is to build troughs from galvanized sheet steel, or Zincanneal, fitted to a suitably designed framework. Commercially turned out prefabricated units are invariably of the steel-framework type. Overleaf is illustrated a typical example.

SIZE.—Lysaght's standard "Queen's Head" or Zincanneal flat sheets are supplied in widths of 24", 30", 36" and 48", lengths 6'-8'. These widths control the capacity of the various sized troughs, as shown in the table below. The gauge of sheet used is dependent on the sturdiness required, and varies from 24g. in the smaller size to 14g. in the largest.

Watering arrangements are improved by having alongside each length of trough a galvanized iron storage tank.

FRAMEWORK.—The framework consists of trough supports, cross stays, side rails, and base angle pieces. These are of 1½" x 1½" angle iron throughout, all joints being made with ⅜" diameter hexagonal bolts and nuts. For the support, a length of 1½" x 1½" angle iron is notched at the appropriate points and formed to shape, providing a semi-circular trough support with two vertical legs. This can be braced, when desired, by a horizontal brace, joining the rim of the semi-circular portion to both legs. Trough supports, in the case of 8' lengths of trough, are placed 6' apart.

FOUNDATIONS.—The trough supports are carried on concrete slabs or timber baulks (old railway sleepers). If concrete is used, as shown in the sketch, ½" diameter "rag" bolts are set in concrete and bolted to the bottom pieces of the framework.

TROUGH BODY.—The trough body is of a suitable gauge "Queen's Head" or Zincanneal flat sheet, this being curved to the required diameter and maintained to the correct shape by fastening to the side rails with ¼" diameter galvanized bolts and nuts, at 3" centres. End pieces are marked out to the required radius, and cuts made to form a number of serrations, ready for folding to the required shape. The end pieces are fitted to the trough body, being riveted at every second serration and soldered. Lengths of troughing are lapped 1½" and riveted with tinmen's rivets, at 3" centres, and soldered.

FITTINGS.—The trough should be fitted with:—

Entry pipe and ball cock valve.
Ball cock valve cover.
Cleaning plug.

Ball cock valve covers can be purchased to fit all the sized troughs mentioned in the table below; alternatively, these can be made of flat galvanized 14g. sheet, curved to shape, and braced with flat iron brackets.

NOTE.—(1) The ground surrounding the trough should be well drained and, if possible, paved with flat stone, as shown, or concreted.

(2) If the water used is bore water, or water from any corrosive source, then it is advisable to paint the inside of the trough with a protective paint. A suitable mixture is one of cement, linseed oil, and terebine.

TROUGH SIZES

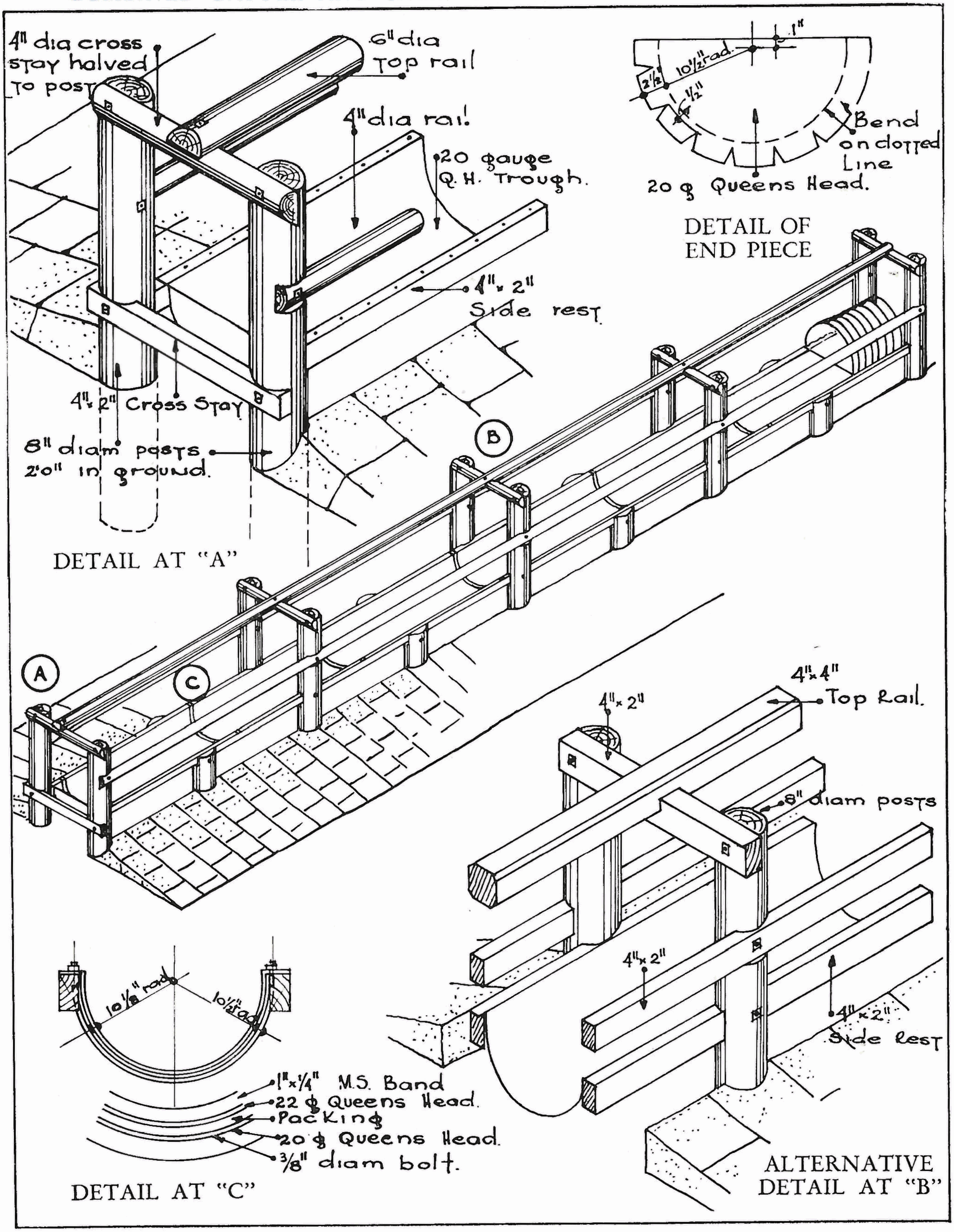
Item	Size 1	Size 2	Size 3	Size 4
Trough width—B ..	15"	18"	21"	30"
Trough depth—D ..	8"	11"	11½"	15½"
Gals./ft. run. ..	4	7.5	8.5	16.0
Width of sheet used	24"	30"	36"	48"
Gauge of sheet used	24, 22	22, 20	18, 16	16, 14

DAIRY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4395

COMBINED CATTLE AND SHEEP TROUGH — TIMBER FRAMEWORK



DETAIL OF END PIECE

DETAIL AT "A"

DETAIL AT "C"

ALTERNATIVE DETAIL AT "B"

COMBINED CATTLE AND SHEEP TROUGH — TIMBER FRAMEWORK

GENERAL.—On many holdings, water troughs are used for watering both cattle and sheep. These are invariably made from galvanized steel sheet, fitted to the requisite steel or timber framework and equipped with the necessary fittings for filling and emptying the trough. Overleaf is illustrated the simplest form, using bush timber or sawn timber for a framework.

SIZE.—The cross sectional area, i.e., the capacity of the trough, is governed by the fact that troughing is made of standard widths of Lysaght's "Queen's Head" or Zincanneal flat sheets. Consequently sizes, as listed below, correspond to widths of 24", 30", 36" and 48". The gauge of sheet used is dependent on the rigidity required, and varies from 24g. in the smaller capacities to 14g. in the largest. Lengths of sheet are either 6' or 8', hence the length of the trough is a multiple of these lengths. In the illustration overleaf, six lengths of 8' sheet are used, giving an overall length of 48'.

Whereas for sheep it is common to use the smaller sizes of 15" x 7" or 18" x 9", when the troughing is being used mainly for cattle, 18" x 9" and 21" x 10½" are preferable.

Lengths of troughing are supplied by firms in prefabricated end pieces, centre sections and ball cock covers, and despatched with all necessary jointing fittings.

FRAMEWORK.—The framework consists of:—

6"-8" diameter posts.
4" diameter or 4" x 2" side rails.
4" diameter or 4" x 2" guard rails.
4" diameter or 4" x 2" cross stays.
6" diameter or 4" x 4" top rail.

The posts are sunk 18"-24" into the ground, that portion in the ground being tarred or suitably treated with Creosote before placing. Posts are halved or scarfed to take side rails, cross stays, and guard rails, all being bolted with ⅜" cup-headed timber bolts, with nuts and square washers. Posts are to be sawn flush with tops of cross stays after assembly of trough.

Guard rails are so placed that cattle drink over the top of the rail, and sheep beneath.

TROUGH BODY.—The trough body is made from a suitable gauge "Queen's Head" or Zincanneal flat sheet. The sheet is marked on either side ¾" in from the edge, folded to form lips on either side, and shaped to the correct diameter.

End pieces are cut, as shown in the design, and serrations flanged over, ready for fitting to the trough body. The end piece is riveted at every second serration to the trough body, and soldered.

The lips of the trough body having been folded over, the trough is placed inside the side rails, adjusted to position, then nailed to the rails with ¾" galvanized clouts, at 3" centres. Cross stays, guard rails, and top rails are then fitted to the posts.

Lengths of troughing are lapped 1½" to form the complete trough, and clamped with the requisite bows, bands, and insertion.

FITTINGS.—The trough should be fitted with:—

Entry pipe and ball cock valve.
Ball cock valve cover.
Cleaning plug.

Ball cock valve covers can be purchased to fit all the sized troughs mentioned in the table below; alternatively, these can be made from flat galvanized 14g. sheet, braced with flat iron brackets, or an old petrol drum.

NOTE.—(1) The ground surrounding the trough should be well drained and, if possible, paved with flat stone, as shown, or concreted.

(2) If the water used is bore water, or water from any corrosive source, then it is advisable to paint the inside of the trough with a protective paint. A suitable mixture is one of cement, linseed oil, and terebine (or gold size).

TROUGH SIZES

Item	Size 1	Size 2	Size 3	Size 4
Trough width	15"	18"	21"	30"
Trough depth	7"	9"	10½"	14"
Gals./ft. run. . . .	3.3	5.5	7.5	13.5
Size of sheet used . .	24"	30"	36"	48"
Gauge of sheet used	24, 22	22, 20	18, 16	16, 14

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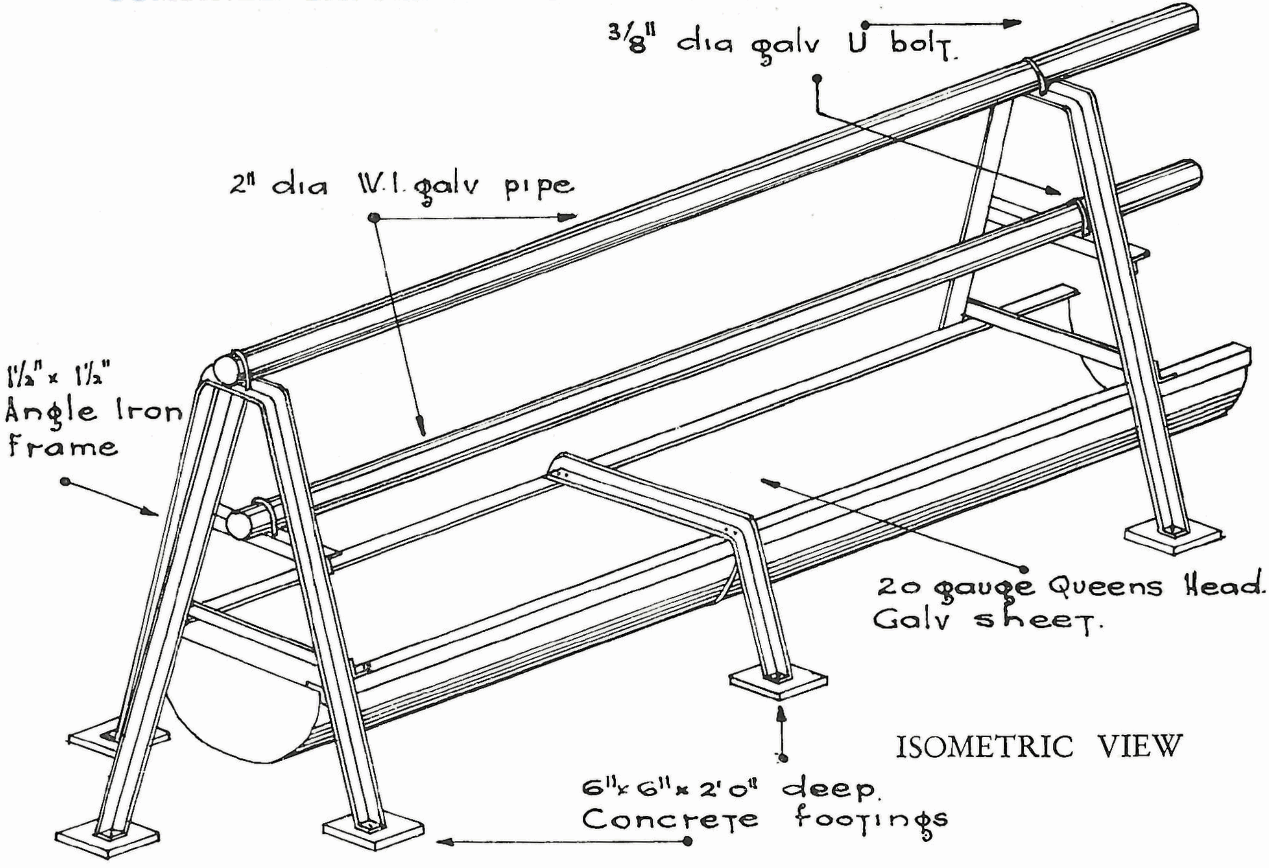
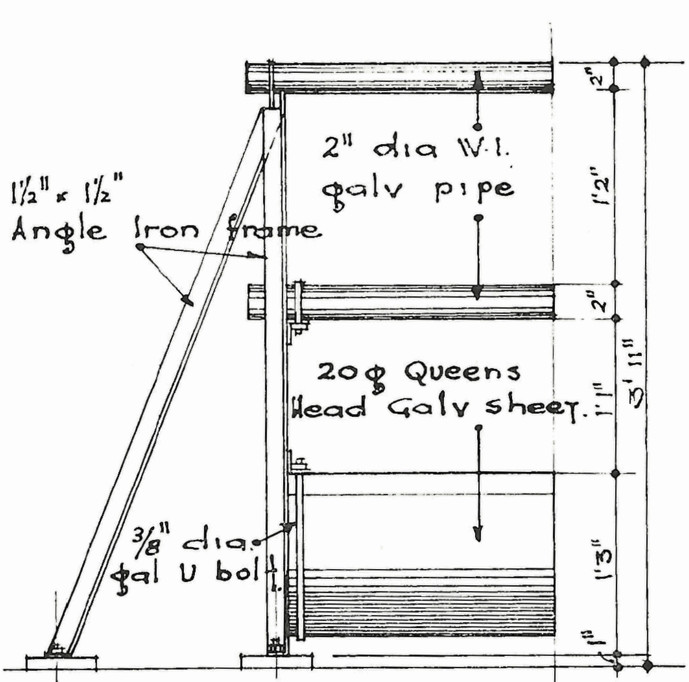
DAIRY SECTION

SHEET 4396

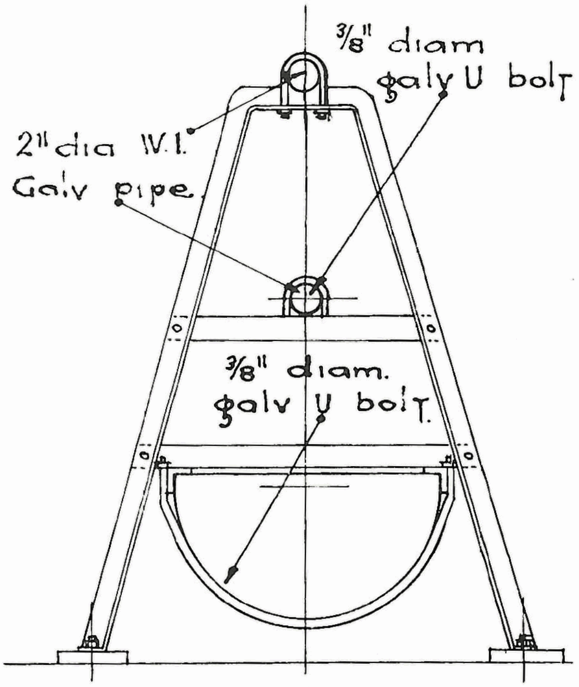
COMBINED CATTLE AND SHEEP TROUGH—STEEL FRAMEWORK


3/8" dia galv U bolt.
2" dia W.I. galv pipe
1½" x 1½" Angle Iron frame
20 gauge Queens Head Galv sheet.
6" x 6" x 2' 0" deep. Concrete footings

ISOMETRIC VIEW



PART SIDE ELEVATION



SECTION

DAIRY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4396

COMBINED CATTLE AND SHEEP TROUGH—STEEL FRAMEWORK

GENERAL.— On many holdings, water troughs are used for watering both cattle and sheep. These are invariably made from galvanized sheet, fitted to the requisite steel or timber framework. The steel framework type is commercially turned out in prefabricated units, and a variety of such shapes exists. The construction can be such that the joints are riveted and soldered, or clamped together with a felt insertion between the lapped sheets of iron. Overleaf is a type in common use.

SIZE.— Established practice is to build troughs from Lysaght's galvanized or Zincanneal sheet. The range of capacity per foot run is controlled by the standard width sheets available. Consequently, there are four sizes in common use, corresponding to 24", 30", 36" and 48" wide sheets, lengths of sheet 6' or 8'. The gauge of sheet used is dependent on the sturdiness required, and varies from 24g. in the smaller sizes to 14g. in the largest.

Whereas for sheep it is common to use the smaller sizes of 15" x 8" or 18" x 11", the larger sizes, 18" x 11" or 21" x 11$\frac{1}{2}$", are preferable when the troughing is being used mainly for cattle. Watering arrangements are improved by having alongside each length of trough a galvanized iron storage tank.

FRAMEWORK.— The framework consists of trough supports, cross stays, side rails, and guard pipes. The supports take three forms, but in all cases are made of 1$\frac{1}{2}$" x 1$\frac{1}{2}$" angle iron. End supports consist of an inverted "V" angle iron shape, with two cross braces, the whole being supported by an inclined angle strut, to take longitudinal thrust. Long intermediate supports are similar to end supports, but do not carry the inclined strut. Intermediate supports are simple in form, as shown, and serve purely to support the sheet troughing. All supports carry side rails and $\frac{3}{8}$" diameter bows. The steel troughing is bolted to the side rails and supported by the bows. All angle iron joints are made with $\frac{3}{8}$" diameter hexagonal bolts and nuts. Fastened to the tops of the long supports and to the highest cross stay by $\frac{3}{8}$" diameter galvanized "U" bolts are the 2" diameter galvanized pipe guard rails.

TROUGH BODY.— The trough body is made from the required gauge "Queen's Head" or Zincanneal flat sheet. Sheets are fastened to the inside of the side rails with $\frac{1}{4}$" diameter galvanized screws and washers. End pieces are cut and flanged to fit the trough body, the join being completed by riveting and soldering. Lengths of troughing are lapped 1$\frac{1}{2}$" to form the complete trough, riveted with tinmen's rivets, and soldered.

FOUNDATIONS.— The trough supports are carried on concrete footings, as illustrated, or alternatively, on timber baulks. The supports are bolted to these foundations with $\frac{1}{2}$" "rag" bolts and nuts.

FITTINGS.— The trough should be fitted with:—

Entry pipe and ball cock valve.
Ball cock valve cover.
Cleaning plug.

Ball cock valve covers can be purchased to fit all the sized troughs mentioned in the table below. Alternatively, these can be made of flat galvanized 14g. sheet, braced with flat iron brackets.

NOTE.— (1) The ground surrounding the trough should be well drained and, if possible, paved with flat stone, or concreted.

(2) If the water used is bore water, or water from any corosive source, then it is advisable to paint the inside of the trough with a protective paint. A suitable mixture is one of cement, linseed oil, and terebine (or gold size).

TROUGH SIZES

Item	Size 1	Size 2	Size 3	Size 4
Trough width	15"	18"	21"	30"
Trough depth	8"	11"	11$\frac{1}{2}$"	15$\frac{1}{2}$"
Gals./ft. run	4	7.5	8.5	16.0
Width of sheet used	24"	30"	36"	48"
Gauge of sheet used	24, 22	22, 20	18, 16	16, 14

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LYSAGHT'S COUNTRY SERVICE

PIG SECTION

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FOREWORD

This Section of the Country Service Manual deals with structures which are peculiar to the breeding and raising of pigs. Certain structures and accessories used in pig farming are common to other aspects of rural activity and will be found elsewhere in the appropriate Section of the Country Service Manual, e.g., Silos and Farm Buildings.

It is impossible to prepare a standard plan and specifications which would provide a suitable piggery for every farm. Individual pig raisers must therefore use their discretion in applying the data shown on the following pages.

To provide good sanitation in the piggery, a pig should be kept either in pasture or cultivation paddocks which should be stocked lightly, and in rotation; or they should be kept on the intensive system and provided with pens which have impervious floors. All buildings should be erected to allow the entry of a maximum amount of sunlight, and to keep out cold winds and rough weather so that the pigs are kept warm and comfortable at all times. This generally means a northerly aspect.

It is always a wise plan to allow for the extension of the piggery when setting out the original buildings so that additional structures erected later will not interfere with the systematic working of the property.

Pigs best fit into the agricultural set up as consumers of waste or surplus products. For this reason a few pigs should be kept on every farm, and large pig farms should be conducted within reasonable distance of food factories, hotel kitchen refuse, or associated with the dairying industry.

At one time piggeries were associated with a low standard of hygiene and unpleasant working conditions. To-day the reverse is the case where modern buildings are constructed with roof and walls of corrugated Galvanized Iron, and concrete floors. Unlike other materials Galvanized sheet is impervious to moisture, and food liquors cannot be absorbed to breed disease as in absorbent housing materials. In choosing of the dimensions of the various buildings and pens, the plan should take into account the standard dimensions of materials used. The chief of these are Corrugated Galvanized Iron and Corrugated Zincanneal Sheet, which can be supplied in both 10-3" corrugations and 8-3" corrugations wide sheet. For all siding and roofing 26g. Red Orb or Red Zincanneal Sheet is recommended. For the construction of tanks, grain silos, circular bins, etc., use 24g. 8-3" corrugations Blue Orb. Where flat sheet is required, as in the construction of flashings, self-feeders, lining of feed bins, etc., use 24g. Queen's Head or Zincanneal Flat Sheet. To hold wet mash and wet foods use troughs made of 14g. or 16g. Queen's Head Sheet.

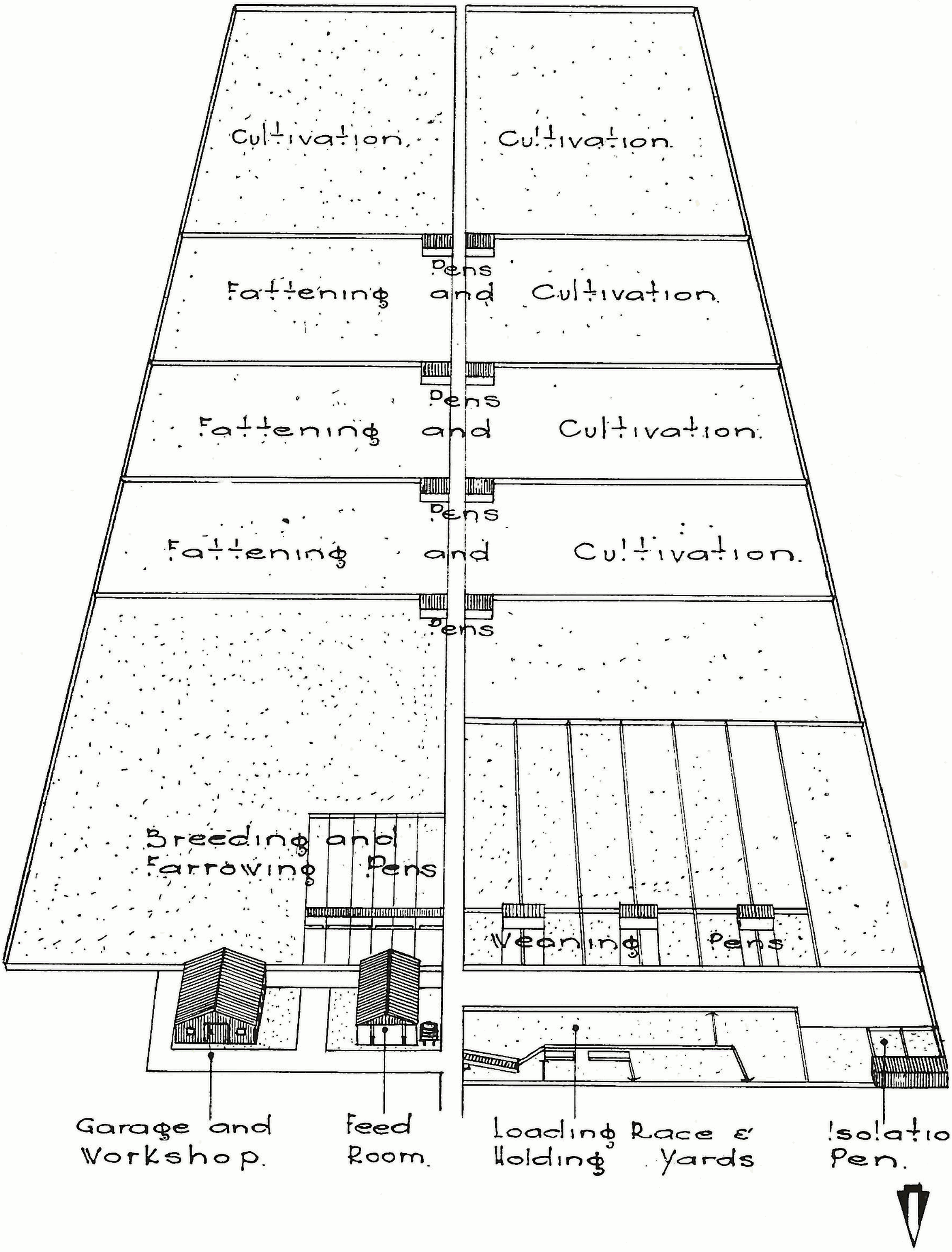
Our advisory service exists for the continuous study of suitable building types, advice and co-operation with the farmer and owner, and the preparation of special Data Sheets. You are invited to contact our Service Department on any particular problem.

PIGGERY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4431A

PIGGERY LAYOUT — PERSPECTIVE


Cultivation.
Cultivation.
Pens
Fattening and Cultivation.
Pens
Fattening and Cultivation.
Pens
Fattening and Cultivation.
Pens
Breeding and Farrowing Pens
Weaning Pens
Garage and Workshop.
Feed Room.
Loading Race & Holding Yards
Isolation Pen.

PIGGERY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4431A

PIGGERY LAYOUT — PERSPECTIVE

GENERAL.— The piggery layout will vary not only with ground and available space conditions but according to the form of pig raising. These include:—

1. Pigs raised for stud breeding purposes, in which ideal conditions of layout occur, and on which expensive structures are encountered.
2. The breeding of market pigs which feed mainly on hotel refuse and/or grain.
3. The fattening runs, which are nearly always used in conjunction with dairies where the pigs are fed on skimmed milk.
4. Minor pig raising where a few pens are kept on each farm to use waste and surplus products, provide stock for local consumption, and/or provide a small source of revenue.

Independent of the purpose for which pigs are raised, the actual method of raising can be grouped into three systems.

The open range or paddock method.
The inside or intensive system.
A combination of both.

The perspective sketch illustrated overleaf depicts a run suitable for the breeding of market pigs which are fed mainly on hotel refuse and/or grain. The layout is mainly of the open range or paddock method, the farrowing and weaning pens having extensive runs.

SITE.— It is of the greatest importance to give careful consideration to the site and the layout of buildings in order to ensure the best health of the animals and the following points should be kept in mind.

1. The site must be well drained and sheltered if possible.
2. The layout should be designed so that working costs shall be kept to a minimum.
3. Allowance should be made for extension at a future date.

DRAINAGE.— Placing pigs on a gentle slope will facilitate disposal of drainage. This demands most careful consideration as waste products should be removed daily. There should not on any account be a closed drain in any pen. A closed pipe is a constant danger while the drain exposed to sunlight is a safeguard against disease. If the soil is sandy loam, it will be more suitable than if it is stiff clay or a soil with a clay sub-soil, both of which are liable to become foul in wet weather.

ASPECT.—All buildings should be erected with a northerly aspect so as to allow the entry of the maximum amount of sunlight, and to avoid the cold winds and rain so that at all times the pigs are kept warm and comfortable. The most favourable site would be on ground sloping to the north.

STRUCTURES AND YARDS.—The component parts of the layout are illustrated overleaf and in most cases detailed in later pages, and consist of:

Drafting area—for loading and unloading pigs.
Feed area—includes feed and mixing room with silos for holding grain.
Breeding or farrowing pens.
Weaning pens—these can also be used for finishing.
Boar pens.

Grazing paddocks fitted up with shelter pens and self feeders. These paddocks are used in rotation with other cultivation paddocks to provide green feed. Auxiliaries found in piggeries and not shown here include:
Wallow.
Oil Dip.

GRAZING PADDOCKS AND SHELTER PENS.—Shelter pens are provided in cultivation paddocks for the housing of pigs after weaning. These shelters are generally used only in inclement weather and it is advisable for them to be of the mobile type as illustrated in Sheet 4447.

PENS AND CONCRETING.— When arranging accommodation for pigs under any system, the accommodation should be such that it:—

Keeps the pigs under control.
Gives them the protection from the extremes of weather.
Provides a high degree of sanitation.
Is convenient to operate.
Has a capital cost which is not excessive in relation to the returns.

When using concrete in pig pens, treatment is necessary to check disintegration caused by and from milk and other foods. The comparatively inexpensive treatment of three applications of silicate of soda (water glass) as the concrete is setting is recommended. The usual method of application is to mix one gallon of silicate of soda with four gallons of water and spray it on to the concrete when it is just beginning to set. This is followed by two or more dressings at intervals of 24 hours.

GARAGE AND WORKSHOP.—This should be placed near the entrance to the holding so that vehicles can be parked and repairs carried out in proximity to the main entrance without traversing the paddocks or pig pen areas.

FEED SHEDS.—The feed shed illustrated more fully in Sheet 4435 combines the functions of storage and treatment together with the storage of the necessary wheeled containers to carry food to the pigs. The central portion is designed as a mixing platform and holding area for wheeled containers, while the balance is divided into two treatment areas.

One side of the shed contains bins and boiling vats for treatment of wet refuse, while the other side contains grist mills and a chaff cutter for treating grain or green crops.

SILOS.—Wherever grain is stored in a piggery, the most economical manner of storage is by the use of tank type Corrugated Galvanized Iron silos mounted on a platform some 3' above ground level.

DRAFTING RACE.—Facilities are provided for drafting, weighing, marketing and loading. These include:—

Loading race and ramp.
Drafting and holding yard.
Weighing crate.
Holding and service yard.

FEEDING.—Cleanliness in feeding is essential. Young pigs require to be fed from clean vessels free from cracks and crevices. Although troughs can be made from concrete surrounded by a concrete platform the surface of which has been suitably treated, it is preferable to install low heavy gauge Galvanized Iron troughs set loosely in concrete pedestals.

SELF-FEEDERS.—To economise farm labour, the value of self-feeders for pigs cannot be over-estimated. Contrary to a widely held opinion, self-feeders do not result in a waste of grain but rather tend to greater saving with higher growth rate of pigs and increased turnover. There are several types of feeders on the market at present and all give satisfactory service. However, a variety of feeders can be readily constructed from small oddments of timber, sheeted with galvanized corrugated or flat iron. The building of such feeders should not be beyond the ability of the average handy man on the farm.

WALLOW.—A wallow provides comfort for the pigs. It is best when shaded and should be constructed of concrete so that it can be easily cleaned, and emptied. A wallow formed by drainage collecting in a depression on the pig run is unhygienic and should be avoided. Wallows are best made shallow, 3" to 4" deep with sides sloped in at about 45°. They should be disinfected regularly with lime.

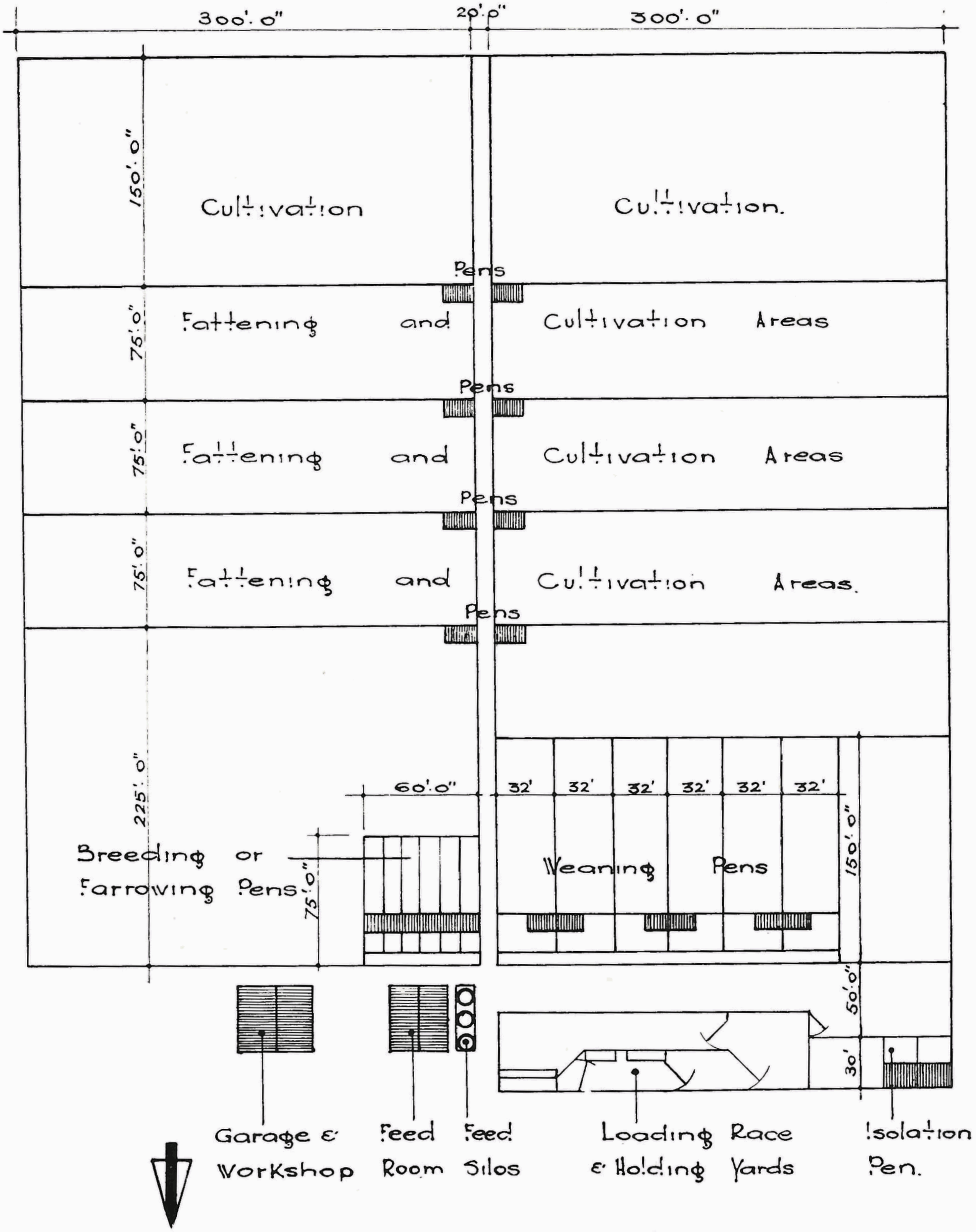
OIL DIP.—Although regarded by many raisers as a luxury, in certain areas an oil dip is essential, particularly before farrowing.

PIGGERY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4431B

PIGGERY LAYOUT — PLAN



PIGGERY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4431B

PIGGERY LAYOUT — PLAN

GENERAL.— This Sheet should be read in conjunction with Sheet 4431A. In dealing with the component parts of the layout an appreciation of the requirements is best obtained by considering the movements of animals and feed.

At the entrance of the farm area, areas are provided for:—

1. Loading and unloading stock.
2. Receiving and treating feed.
3. Storage of vehicles and workshop facilities.

The loading and unloading area should include:—

Loading Race and Ramp.
Drafting and Holding Yard.
Weighing Crate.
Holding and Service Yard.
Quarantine Pen. (In certain layouts this may be some distance from the other portions of the area.)

In the feeding and receiving area there should be facilities for:—

Storage of grain—silos and bins.
Storage of wet refuse.
Treatment by boiling of wet refuse.
Gristing of grain.
Cutting of green feed.

Beyond the feed and unloading areas will be found the various pens or stys for farrowing, or weaning and finishing, so placed that the drainage from the old adult stock areas does not cross the ground carrying young stock. These pens include:—

Farrowing Pens.
Boar Pens.
Weaning and Finishing Pens.

The essential features of good pig pen layout is that the pens should face North, sunlight being the most effective germicide. Building should be on ground, which will ensure good drainage. Floors of the pens should be concrete in order that they may be cleaned daily and be absolutely sterilized at regular intervals.

At the far end of the holding are the shelter pens located in $\frac{1}{4}$ acre paddocks. These latter paddocks are used in rotation with other cultivation areas to provide green feed.

On many farms will be found auxiliary structures of great value for pig welfare, e.g.:—

Wallow.
Oil Dip.

SITE.— When planning, consideration should be given to aspect, drainage, type of soil, wind direction, provision for shade, ample water supply and easy working conditions.

BREEDING OR FARROWING PENS.— Breeding or farrowing pens are generally constructed in groups. These consist of a number of units, each 10' wide x 8' deep with a yard, 40' long x 10' wide for exercise. Plenty of yard room is essential for the welfare of pigs. A typical form of construction is illustrated on Sheet 4442.

WEANING OR FATTENING PENS.—Pens used, either for weaning or fattening and finishing are 16' wide x 8' deep, having an exercise yard of 32' wide x 150' deep. When not in use for weaning or finishing the exercise yards can be used for cultivation. It is generally found to be advisable to build these pens in pairs, as illustrated in Sheet 4445.

BOAR PENS.— Boar pens are placed as required, generally on the end of the farrowing pen runs and may be of similar construction, without the farrowing rail and "creep".

FEEDING.—For successful feeding it is essential that ample trough room be available; approximately 1' length of trough per pig is desirable. Bars or grates placed lengthwise over the trough will keep the pigs from entering the trough.

The heavy work of conveying feed to pigs, especially milk should be reduced by the adoption of labour saving devices. Chief of these is an installation consisting of small 200-400 gallon Corrugated Galvanized Iron tanks, mounted on four wheel trolleys. These trolleys can run on either 3" x 2" hardwood rails or secondhand mine rail. Another scheme is to use two-wheel steel barrows similar to those used in wheeling concrete.

Wherever grain is stored in the piggery layout, then the most economical use of storage is by the tank type Galvanized Iron silos mounted on a platform some 3' above ground level.

FENCING.—Satisfactory pig fencing has always been a problem to the farmer, but in most cases an economical fence is provided by using good pig netting with 6" x 4" posts (or 6" dia. round) 9'-12' apart. This fence should be some 3' 6" high. In the case of older pigs a barb wire should be used along the top and bottom to prevent the fence being rooted under and knocked about.

The recently introduced electric fence has helped to solve the problem, and its convenience, effectiveness and low cost commend it to the farmer who has more than a quarter of a mile of pig fencing to erect.

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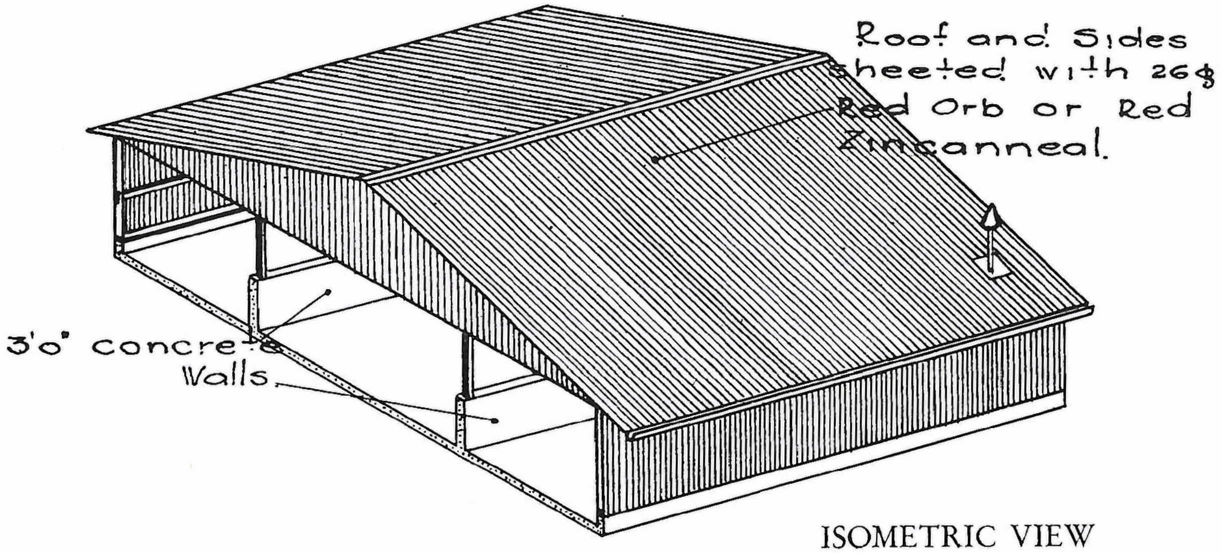
PIGGERY SECTION

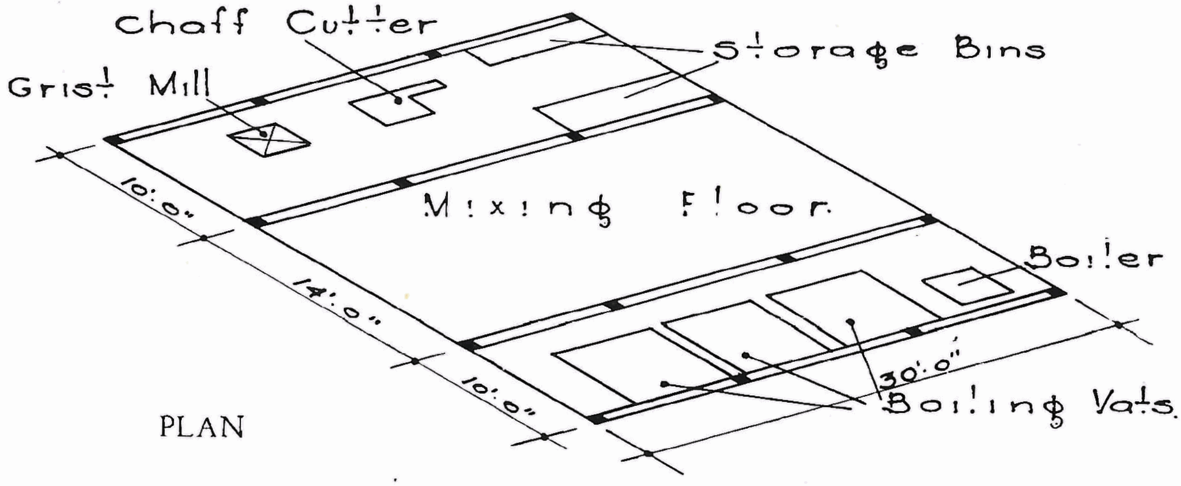
LYSAGHT'S COUNTRY SERVICE

SHEET 4435

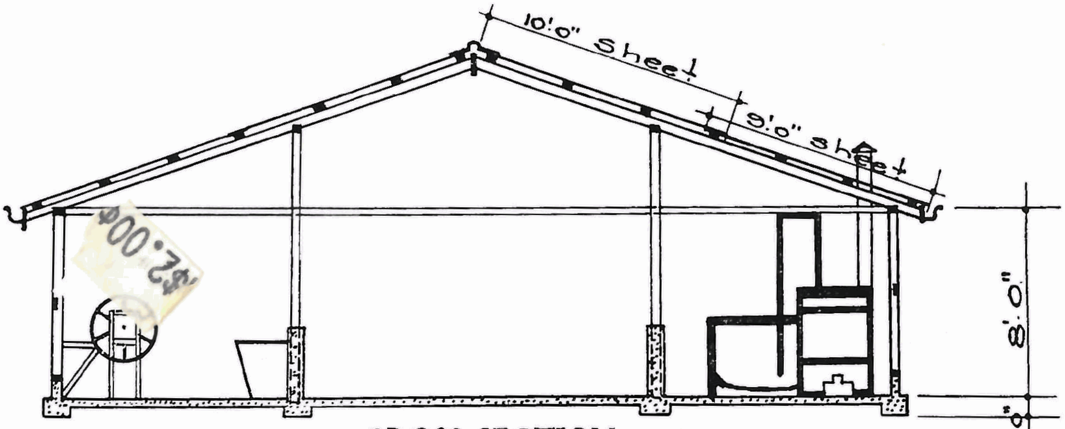
FEED SHED



ISOMETRIC VIEW



PLAN



CROSS SECTION

PIGGERY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4435

FEED SHED

GENERAL.— The feed shed, illustrated overleaf, combines the functions of storage and treatment, together with the storage of the necessary wheeled containers to carry the food to the pigs. The central portion is designed as a mixing platform and holding area for wheeled containers while the balance is divided into two feed treatment areas.

As illustrated, one portion contains bins and boiling coppers for treatment of wet refuse, while the other side contains a grist mill for crushing grain and a chaff cutter for treating green crops.

Although shown as open at both ends, for wetter districts one end can be completely enclosed, while the other end is open at the central portion only. The two outer chambers in such a design are completely enclosed and practically vermin proof. Feed is thrown over the 3' high dividing wall into the central mixing area.

Wherever grain is stored in the piggery layout, the most economical method of storage is by the use of tank type Corrugated Galvanized Iron silos mounted on a platform a minimum of 3' above ground level. These are generally located on the feed processing side of the shed.

FLOOR.— The floor should be of 5:3:1 concrete and graded to fall towards the exits of the shed. This is 3" thick apart from fittings under dwarf walls or foundation blocks under machinery or heavy bins. When using concrete on the food mixing platform or near the food storage and treatment bins, it is necessary to check disintegration caused by food acids. The comparatively inexpensive treatment of three applications of silicate of soda (water glass) as the concrete is setting is recommended. The usual method of application is to mix one gallon of silicate of soda with four gallons of water and spray it on to the concrete when it is just beginning to set. This is followed by two or more dressings at intervals of 24 hours.

DWARF WALLS.— Dwarf walls are to be constructed of 5:3:1 concrete 4" thick. Bottom plates for the outside walls are bolted to a 12" high dwarf wall with ½" dia. rag bolts set in concrete a minimum depth of 3". Central division concrete walls are 3' high and are poured after the structure is built, the internal posts being potted in concrete.

RE-INFORCEMENT.— All dwarf walls should preferably be reinforced at the intersection of the floor and wall by means of short lengths of reinforcement rods or ½" wire netting embedded in the concrete. The wire netting should extend about 12" on either side of the angle made by the floor with the walls.

POSTS.— Internal posts are to be 4" x 4" hardwood spaced at 10' centres and set 2' 6" into the ground. They should preferably be potted in concrete blob footings some 12" in diameter.

WALL FRAMING.— Side walls are framed up in:—

4" x 2" top and bottom plates.
4" x 4" corner studs.
4" x 2" intermediate studs at 3' 4" centres.
3" x 1½" battens checked into studs.
4" x 2" girts for end gable sheeting.

If end walls are to be completely covered, frame up in 4" x 2" vertical studs and 3" x 1½" battens, with required door and window openings.

ROOF FRAMING.— Frame up roof in:—

4" x 2" plates carried on top of posts.
4" x 2" rafters at 3' centres, birdsmouthed over wall plates, and internal plates, rafters to be lap jointed at the apex.
3" x 1½" battens.
4" x 2" ties.

ROOF SHEETING.— The roof is sheeted with 10' lengths of 26g. 10-3" corrugations Red Orb or Red Zincanneal Sheets with 1½ corrugations side lapped and a minimum of 6" end lap. Sheets shall be secured to battens with spring-headed roofing nails pierced through the top of every second corrugation at end fixing, and three to each sheet at intermediate battens.

WALL SHEETING.— The exterior walls are sheeted where required with 8' lengths of 10-3" corrugations 26g. Red Orb or Red Zincanneal sheets applied with a side lap of one corrugation. Sheets are to be secured to top and bottom plates and to one intermediate batten with spring-headed roofing nails pierced through the top of every third corrugation at end of sheet and every fourth corrugation on intermediate points.

RIDGING.— Ridge capping shall be of standard section formed from 18" wide strips of 24g. Queen's Head Galvanized Iron or Zincanneal sheets in 6' or 8' lengths. Ridgings shall be lapped at least 6" at the joints and securely fixed in position in conjunction with the roof sheeting with spring-headed roofing nails.

EAVES GUTTERS.— Eaves gutters are to be of 24g. Queen's Head Galvanized Iron or Zincanneal of the 4½" beaded quadrant type fixed in position with required falls to one end, and secured with 16g. galvanized brackets to the foot of roof rafters.

DOWNPIPES.— Provide and fix where required 24g. Queen's Head Galvanized Iron or Zincanneal 3" diameter round downpipe with the necessary bends and joints. It is an advantage to instal a 2,000 gallon corrugated Galvanized Iron water tank at one end of the structure.

FLASHING.— Flash area around boiler outlet pipe with 24g. Queen's Head or Zincanneal flat sheet.

WATER SUPPLY.— A good water supply is essential both for the boiler and for washing out the mixing area.

DOORS AND WINDOWS.— Provide standard size doors and windows where required.

INTERNAL FITTINGS.— The following plant is installed in positions where required:—

Grist mill for crushing grain.
Chaff cutter for cutting green fodder.
Grain bins for crushed grain and supplementary food.
Refuse bins (vats) for storage of wet refuse.
Boiler with the necessary overhead steam pipes and vats for boiling refuse.

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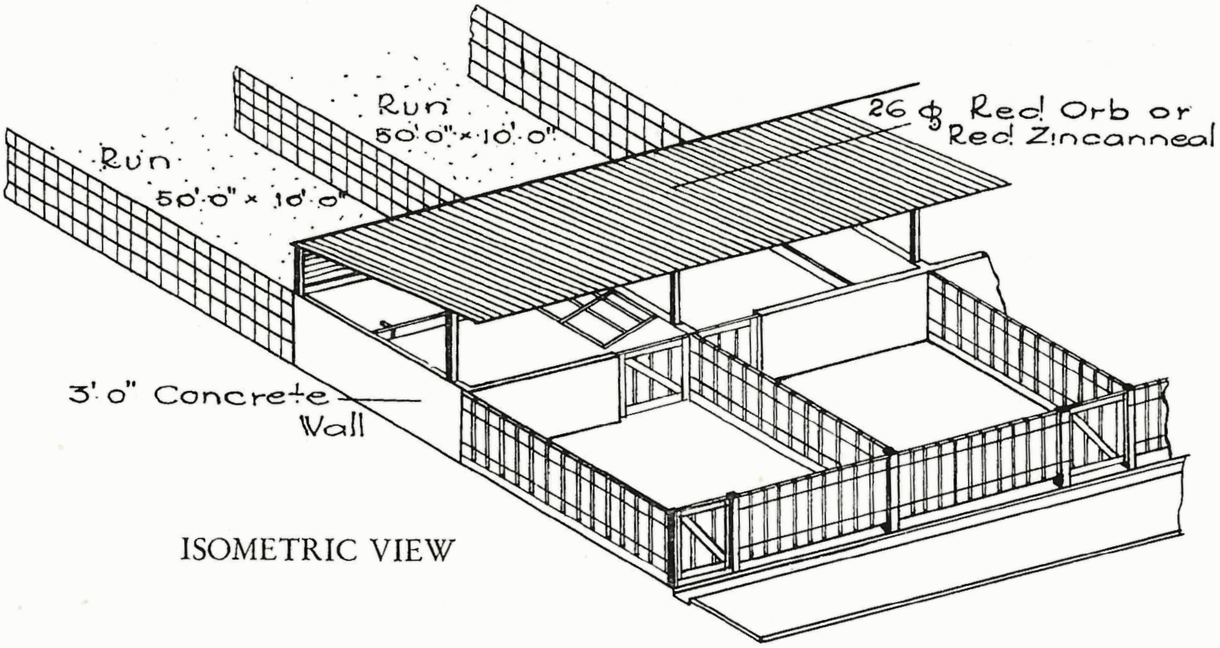
PIGGERY SECTION

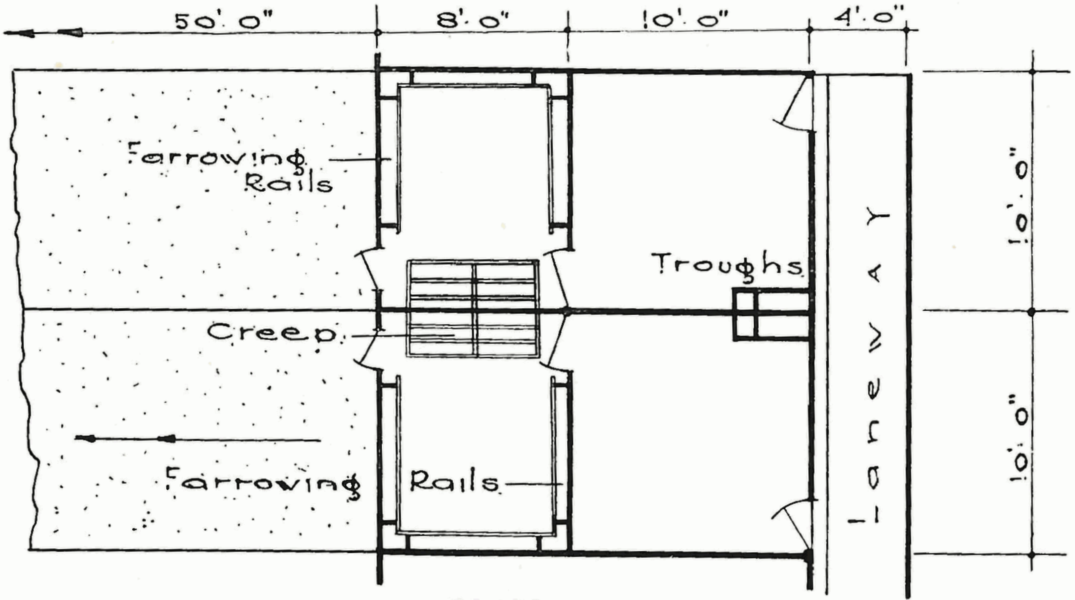
LYSAGHT'S
COUNTRY SERVICE

SHEET 4442

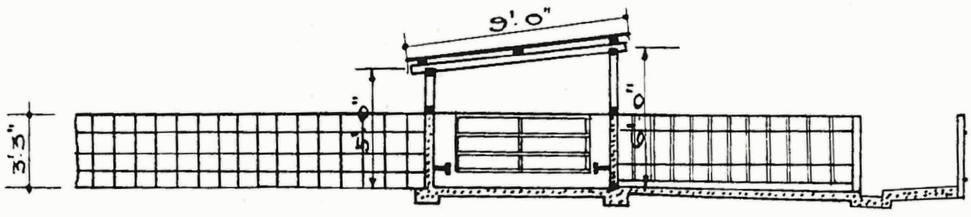
FARROWING OR BREEDING PEN



ISOMETRIC VIEW



PLAN



CROSS SECTION

PIGGERY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4445

WEANING OR FINISHING PENS

GENERAL.—The essentials for a weaning pen are that the housing portion shall be dry and warm—protected from adverse weather conditions, and open at the front to admit as much sun as possible. It is very convenient to build these pens in twin units as illustrated overleaf. A suitable size is 16' wide by 8' deep with an exercise yard 32' by 150'. The exercise yards during part of the year are generally placed under cultivation. If used for finishing purposes as well as weaning, the floor space required per animal is approximately 10 sq. ft. (apart from yards or dunging-passage).

The floor, dwarf walls and front yard should be constructed of 5:3:1 concrete. Dwarf walls are to be 3" thick and poured to heights as required. All floors are to be 4" thick and laid with sufficient slope, 1" in 5' to guarantee good drainage. It is an advantage to have a small 3" by 4" step down from pen floor level to yard level in order to keep the shelter dry and clean.

Treatment of the feeding yard and floor of the surface of the pen is necessary to check disintegration caused by food acids and other solvents. The comparatively inexpensive treatment of three applications of silicate of soda (water glass) is recommended. The usual method of application is to mix one gallon of silicate of soda with four gallons of water and spray on to the concrete when it is just beginning to set. This is followed by two or more dressings at intervals of 24 hours.

DRAINS.— A 12" wide, 6" deep drain is essential along the front of the pens, and where a long run of units is used. It is advisable to instal frequent sumps from which waste refuse can be bailed daily.

FRAMEWORK.—The pens are framed up in:—

4" x 4" posts.
4" x 4" plates.
3" x 2" rafters.
3" x 1" battens.

ROOFING.—The roof is sheeted with 9' lengths of Lysaght's 26g. 10-3" corrugations Red Orb or Red Zincanneal sheet applied with a side lap of 1$\frac{1}{2}$ corrugations. Sheets are fixed with spring-headed roofing nails through the top of every second corrugation at the ends of sheets and through the top of every fourth corrugation at the intermediate battens.

WALL SHEETING.—The rear wall is to be sheeted in the case of the twin unit illustrated overleaf with 8' and 9' lengths of Lysaght's 26g. 10-3" corrugations Red Orb or Red Zincanneal sheet with an end lap of 4". Sheets are fixed to vertical posts with spring-headed roofing nails.

FENCES.— Pen fences are to be 3' 3" high and constructed of:—

6" x 4" posts set in concrete.
4" x 1" twin longitudinal rails top and bottom.
4" x 1" slats at 1" spacing.

GATES.—Gates are provided into the weaning pen and from the weaning pen yard into the open run. These are framed up in 4" x 1" timbers.

TROUGHING.— Heavy gauge feed troughs and automatic water supply are installed for the use of the pigs. These are to a pattern desired by the owner.

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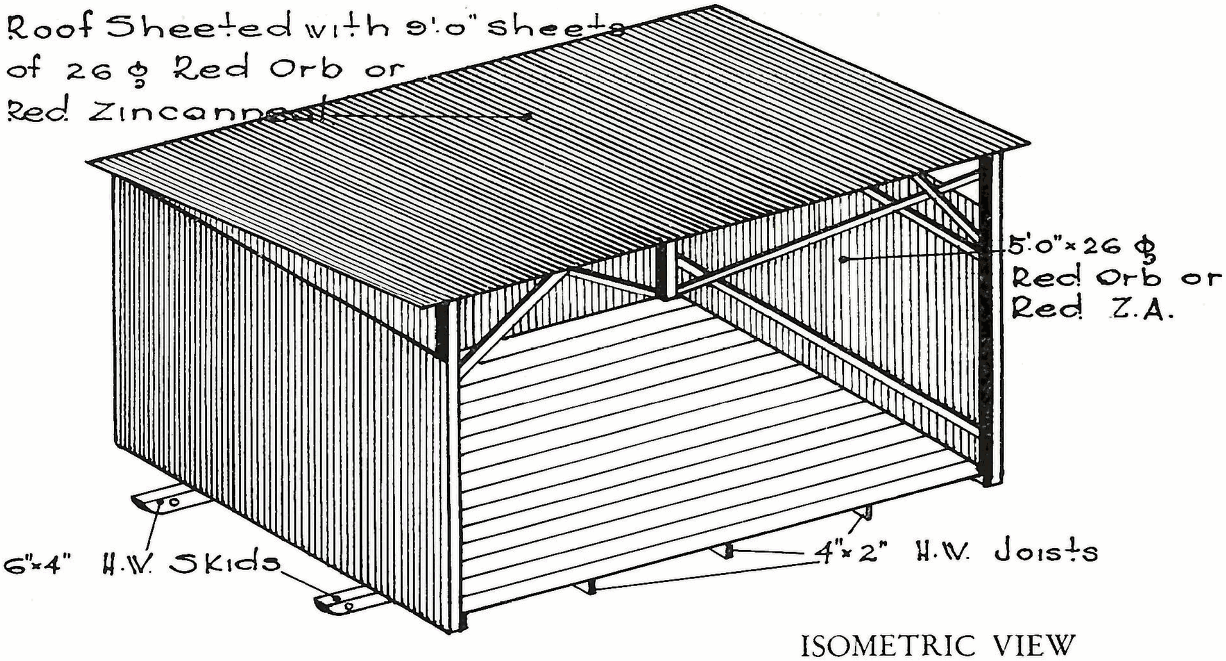
PIGGERY SECTION

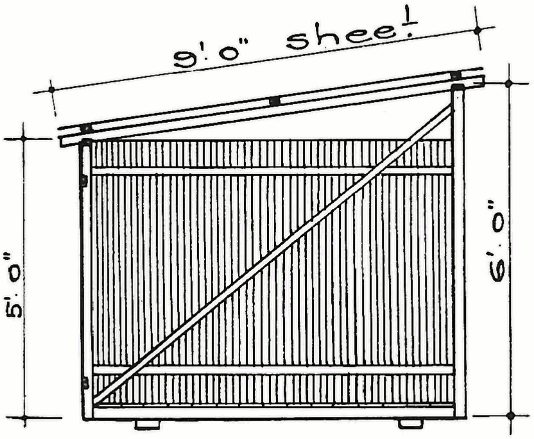
LYSAGHT'S COUNTRY SERVICE

SHEET 4447

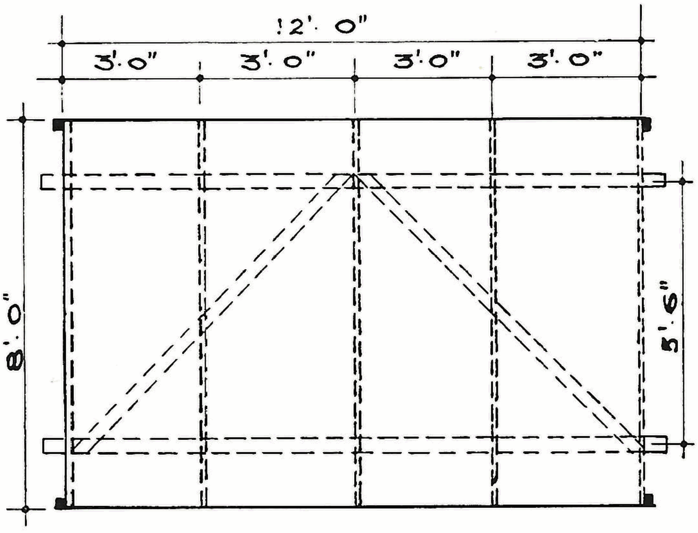
MOBILE SHELTER PEN


Roof Sheeted with 9'0" sheets of 26 g Red Orb or Red Zincanneal
5'0"×26 g Red Orb or Red Z.A.
6"×4" H.W. Skids
4"×2" H.W. Joists

ISOMETRIC VIEW



CROSS SECTION



PLAN

JOHN LYSAGHT (AUST.) PTY. LTD.

PIGGERY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4447

MOBILE SHELTER PEN

GENERAL.— Shelter pens are provided in cultivation paddocks for the housing of pigs after weaning. If mobile sheds are provided, as illustrated overleaf, then paddocks can be cultivated or grazed in rotation. This type of shelter can be drawn by motor vehicle, small farm tractor, or farm horse.

PLATFORM.— Specifications for the timber used for framing need not be exacting, and roughly milled local hardwoods can be used throughout, framed together as indicated in the sketch, and consisting of:—

6" x 4" bearers or runners, rounded at the ends to form skids and holed to accommodate suitable towing gear.

4" x 2" joists spaced evenly on the length of the feeder at 3' centres and bolted to the bearers with $\frac{3}{8}$" dia. cup headed timber bolts. The heads and nuts of bolts are fitted with square washers and deeply countersunk.

3" x 1" braces halved into and bolted to the bearers and joists.

4" x 1" hardwood timber decking.

WALLS.— The superstructure consists of:—

4" x 4" Corner studs.
4" x 2" Studs.
3" x 1" Battens.
4" x 2" Plates.
3" x 1" Bracing.

Wherever practicable, joints are bolted with $\frac{3}{8}$" dia. bolts and square washers.

ROOF FRAMING.— The roof is framed up with:—

3" x 2" Rafters.
3" x 1" Battens.

ROOF SHEETING.— The roof is to be sheeted with 9' lengths of 26g. 10-3" corrugations Red Orb or Red Zincanneal sheet applied with a side lap of $1\frac{1}{2}$ corrugations. Sheets are fixed with galvanized roofing screws and washers, through the top of every second corrugation at end points, and through the top of every third corrugation at the intermediate batten.

WALL SHEETING.— The walls are sheeted with 5' lengths of 26g. 10-3" corrugations Red Orb or Red Zincanneal sheet applied with a side lap of one corrugation. Sheets are fixed to the top plate and to battens with galvanized roofing screws through the top of every second corrugation at end points, and three to each sheet at the intermediate batten.

NOTE.— Wherever practicable in a mobile shelter, timber joints should be bolted and not nailed.

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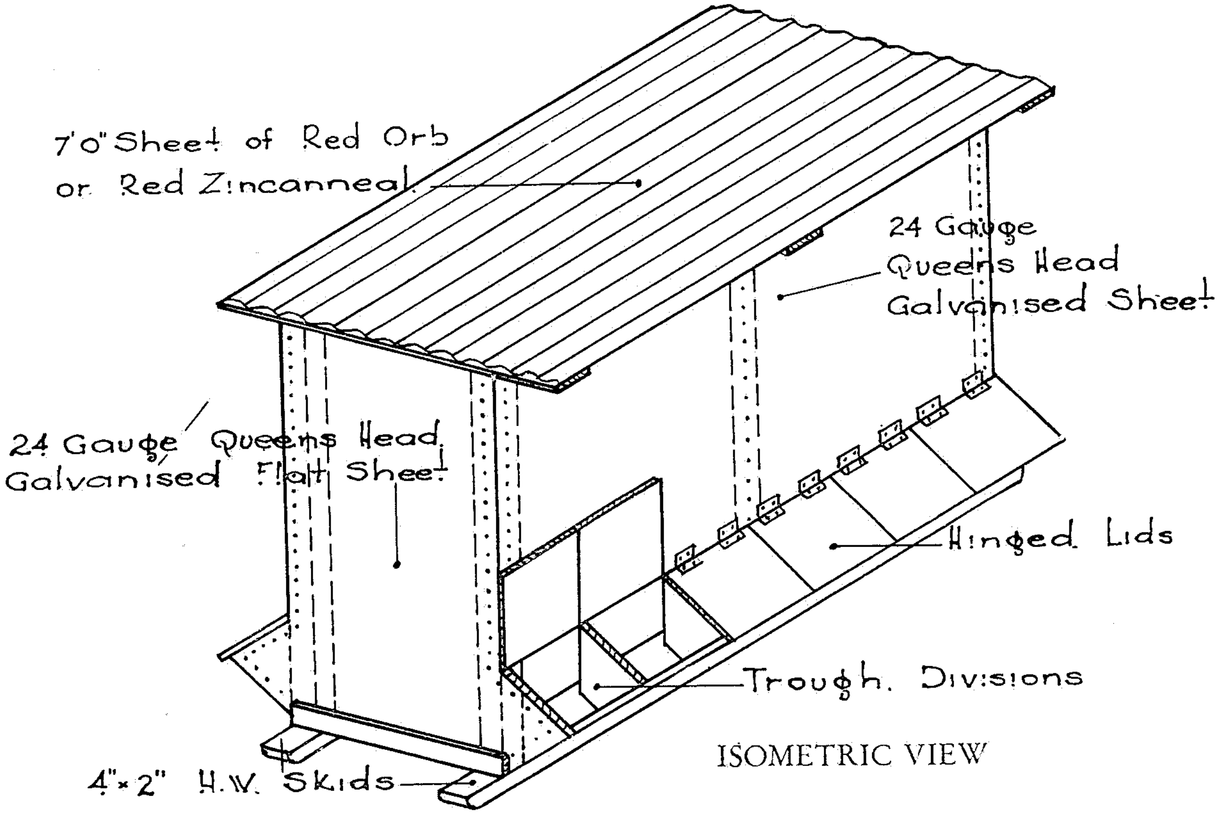
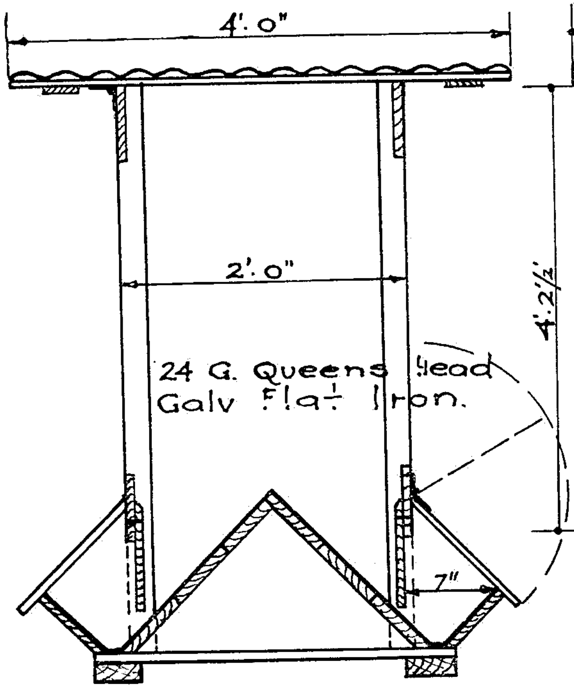
LYSAGHT'S COUNTRY SERVICE

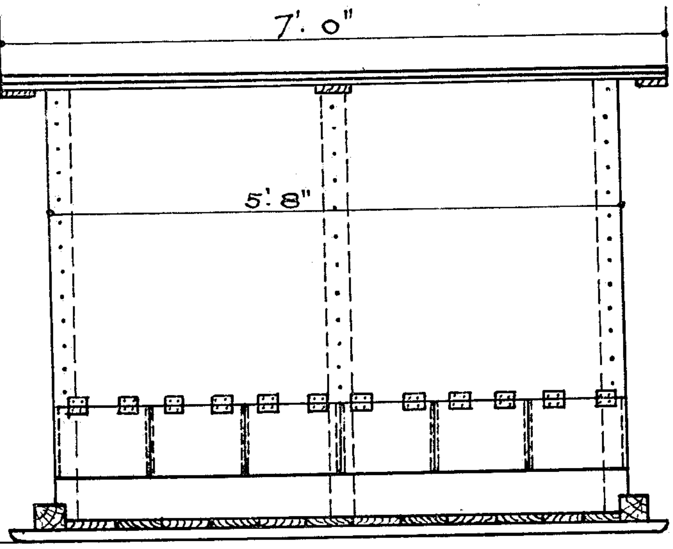
SELF FEEDER



ISOMETRIC VIEW



CROSS SECTION



SIDE ELEVATION

JOHN LYSAGHT (AUST.) PTY. LTD.

PIGGERY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4453

SELF FEEDER

GENERAL.— Self-feeders save labour and give good results where maximum rates of growth and fattening are required from a diet consisting mainly of cereal grains, or meals. Contrary to a widely held opinion, self-feeders do not result in a waste of grain, but rather tend to a greater economy, at the same time giving a higher growth rate for pigs and an increased turnover.

Self-feeders need to be replenished only once in four or five days and eliminate the necessity for feeding twice daily. Adjustment of feeding rates is automatic, and all pigs will receive as much feed as they require, the smaller pigs not being crowded out by the larger ones.

There are several types of feeder on the market at present, and all give satisfactory service. They can be fixed or mobile, depending upon the wishes of the pig raiser. Small feeders should be designed so that they can be shifted conveniently by two men when empty. Large types, as illustrated, are placed on skids for movement from paddock to paddock.

The type, as illustrated, is of approximately 35 bushel capacity.

FRAMEWORK.— Specifications for the timber used in framing need not be exacting, and roughly milled local hardwoods can be used throughout, framed together in sizes as listed.

Skids	4" x 2"
Bearers	3" x 2"
Posts	3" x 2"
Battens	3" x 1½"
Sheeting	6" x 1"

4" x 2" runners are rounded at the ends to form the skids and fitted with brackets to take suitable towing gear.

In portable types, such as illustrated, bolts and not nails should be used wherever possible to stand up to any rough treatment given the structure by the pigs, and towing from place to place.

BIN.— The bin is sheeted with 24g. Queen's Head Galvanized flat sheet, fastened to the wall framing with ¾" galvanized clouts. To each long side use 1-6' x 36" x 24g. Queen's Head Galvanized flat sheet. To one end and lids for one side, use one 6' x 36" x 24g. sheet. Thus four sheets are sufficient to construct the complete bin.

FEED TROUGHS.— At the lower end of the bin is a gap on either side through which the grain flows into a partitioned feeding trough. The size of this opening and hence the rate of feeding can be set by the adjustment of a slotted regulating board. This board is clamped as required, by a bolt, washer, and wing nut. Though shown in the sketch as a board, heavy 16g. or 14g. Galvanized flat sheet is most suitable and much preferred by some manufacturers.

The dividing V baffle wall is built in the centre of the grain holding chamber to distribute the grain to both troughs. This can be built as shown, of 1" board lined with 24g. Queen's Head Galvanized flat sheet, or alernatively framed up from 16g. Queen's Head Galvanized flat sheet, folded to size and suitably supported.

Hinged lids protect the food from weather, rats and birds (when not in use). These hinges can be of the normal domestic construction type, leather, or the ends of the Galvanized sheet can be suitably cut and folded round 8g. wire to make the hinge part of the structure.

TOP.— The feeder is fitted with a hinged top of 3" x 1" battens, on to which are fixed 2-7' lengths of 24g. 8-3" corrugations Red Orb or Zincanneal. The top should project well over the troughs so that water will not drip into the grain.

PAINTING.— The whole structure should be painted with any good proprietary line of oil paint in order to afford a maximum protection from the weather.

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ORB
AUSTRALIA

Websdale, Shoosmith Pty. Ltd., Printers, 117 Clarence Street, Sydney.

SILO SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4511

GRAIN SILOS — GENERAL

CHOICE OF A SILO.—A Corrugated Galvanized Iron Silo is the most efficient and economical method of storing grain. Storage may be carried out in one large or several small silos, as desired, and here individual requirements must be considered. Generally, silos are required for one or all of the following purposes:—

(i) Fodder Conservation.
(ii) Seed Storage.
(iii) Storage of crop awaiting marketing.

And the use to which the silo will be put should largely govern its choice, both in respect of capacity and type. Galvanized Iron Silos are obtainable in two principal types and in several capacities in each type. Broadly, the larger silos, with capacities running up to 6,000 bushels of grain, are constructed of galvanized sheets with the corrugations running vertically and supported on the outside by a number of steel bands. The smaller type, which rarely exceeds a capacity of 2,000 bushels, is made with curved galvanized sheets after the familiar style of the ordinary water tank.

THREE 3,600 BUSHEL SILOS

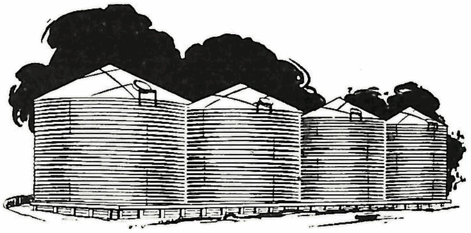
Where fumigation is required, a silo must be kept as airtight as possible, and, whilst this presents little difficulty or cost in the tank type, it is both difficult and costly in the larger type. It is estimated that only 70% kill is obtained in the latter, and, therefore, where 100% kill is demanded, the tank type of silo should be erected.

A further guide to selection is given by the local facilities available for filling and emptying. Large silos must be filled either by hoist, blower, or elevator, the last named being almost out of the question by reason of its cost, unless large quantities are to be handled. Smaller silos, suitably located and up to eight feet in height, can be conveniently loaded through the filling hole from the table of any standard lorry.

Where it is necessary to turn over the contents of a silo, this can be as easily performed in either type, but in each case a spare silo is required.

The final factor governing the choice of a silo is that of cost. Quotations are apt to be confusing, as some makers omit from their quotations many necessary extras such as rake-holes, outlet chutes, and manholes, and, in some larger types, the timber supports which are needed inside the silo. Consideration must also be given to the cost of the timber or concrete stand required by the larger and higher type, whereas the smaller can often be bedded on sand. However, generally speaking, the cost per bushel of the large silo, where applicable, is very slightly lower than the cost per bushel of a number of smaller ones, the difference being often outweighed by the flexibility of the latter arrangement.

FOUR 900 BUSHEL "TANK" TYPE SILOS



FOUNDATIONS.— Before a silo can be constructed, consideration must be given to the most suitable type of foundation. These are generally formed in three particular types, any of which may be altered to suit individual requirements. In considering foundations, it is necessary to determine how it is proposed to bag grain from the silo. If the silo is on ground level a pit may be dug to allow the bag to hang for bagging. If the silo, on the other hand, is raised above ground level, the height, if so desired, may be such that the bag may be filled without any excavation.

(a) TIMBER STAND FOUNDATION: This is generally erected at a height to fix the outlet chute from the silo three feet above the ground level, which allows the bag to be filled without excavation. For design of timber stand see Data Sheet No. 4512A. The initial cost of the timber stand, of course, depends on the height of the silo, which regulates the load the stand is to take.

In constructing a timber stand, the pillars supporting the bearers must either rest on concrete footings or other suitable material to distribute the load to suit the requirements of the local soil. Generally, a load not greater than 15 cwt. per sq. ft. of area should not be exceeded.

(b) CONCRETE STAND: This is formed by making a ring of concrete some 6" above ground level, the ring being exactly the same diameter as the bottom of the silo. Any projecting edges of concrete should be chipped off so as to prevent rain water from running in between the bottom sheet of the silo and the concrete stand.

(c) SAND BED: A bed may also be formed for the silo by the means of strongly pegging out an area with sleepers, which are left some 4" above ground level, the interior being filled with sand and the silo erected on the sand. Alternatively, the framework can be formed by using a corrugated galvanized iron ring, which should be sunk into the ground so as to project only about 6" above ground level. Stout timber stakes about 3½' long should then be driven into the ground at a spacing of about 2' 6" around the outside of the ring, the interior of which is then filled with sand to form a foundation for the silo. It is to be remembered in all cases that it is advisable to paint the underside of the bottom of the silo with one coat of a heavy quality bitumen paint. Whichever form of foundation is used, IT IS ABSOLUTELY ESSENTIAL THAT WHEN A SILO IS ERECTED ON ITS FOUNDATION, THE SIDES BE MAINTAINED PERFECTLY VERTICAL, as any tilt results in eccentric loading, which has been the cause of failures in the past.

GRAIN SILOS—GENERAL (Contd.)

Unless securely anchored, an empty silo is liable to be moved or even blown off its foundation by a high wind. Provision for anchoring is easily made as follows:—

For silo of the tank type with horizontal corrugations, at least two 8-gauge galvanized wires on which four rings have been threaded should be twisted tightly round the silo in one of the corrugations. Tie wires are then affixed to the four rings (which should be evenly spaced round the silo) and made fast to the foundations. Silos with vertical corrugations have horizontal bands to which four similar tie wires can be secured. As previously noted, where concrete foundations are employed, suitable eyelets should be concreted in with the foundation.

As regards the erection of the silo itself, where this work is not performed by the local plumber, it is customary for the supplier of the silo to furnish adequate directions. If required, advice can always be secured from the Department of Agriculture, or John Lysaght (Australia) Pty. Limited, Box 196, G.P.O., Sydney.

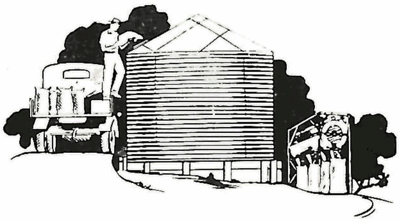
OPERATION OF SILOS.—The methods to be employed for filling and emptying silos must of necessity be decided before the height, size and location are determined.

Filling can be carried out in a number of ways, of which the following are in general use:—

(a) If the height of the silo does not exceed 9' from the ground level, the grain can be loaded through the filling hole from the table of a standard lorry, provided that, if only one man is to be employed, the bags of grain are not more than half full. It would probably be satisfactory to go to even 10' in height and use a small platform on the lorry, about 18" high.

As an alternative to the above, an earth ramp, about 18" high, could be made at the back of the silo for the lorry to run up, which would further assist in easing the loading operation.

A very attractive variation is to locate the silos on a slight slope. The advantages of this arrangement are clearly depicted in the following diagram:—



LOCATION OF TANK TYPE SILO ON SLOPING GROUND

(b) Another method of loading is by erecting two poles close to the filling hole and fixing a block and tackle on a cross beam at the top of the poles. The grain is then elevated either by hoisting the bag direct or by emptying the bag into the tipping bucket, which is then hoisted and emptied into the silo. The elevating can be accomplished by means of a small hand winch, which is rather a slow method, or, alternatively, by means of a horse, lorry, or light tractor.

None of the above operations are by any means difficult, but involve the erection of a filling platform outside the silo, about $3\frac{1}{2}$' below the filling hole.

(c) The elevating of the grain can be carried out entirely by mechanical means, providing the height from the charging of the wheat to entering the silo does not exceed 20'. At any greater height, the grain is liable to be damaged.

The method employed is to purchase a blower, which may be driven by a tractor, oil engine, or electric motor at a speed of 1,000 r.p.m. A galvanized iron pipe is connected from the blower outlet, and delivers direct to the filling hole at the top of the silo. Care must be taken that there are a minimum of bends, and that the pipe is airtight. A diameter of pipe about $5\frac{3}{4}$" is generally used. A small grain hopper is erected on the ground to hold about five bags of wheat, and from this hopper the wheat is fed direct to the blower through an easily controlled sliding trap door, which readily governs the amount of wheat delivered to the blower. This equipment will handle approximately 600 bushels of wheat per hour.

(d) Mechanical elevating may also be carried out by means of a small bucket elevator. These are generally costly, and usually do not justify the initial expenditure unless they can also be put to other use.

Whichever method is adopted, centre filling, which adds considerably to the cost of the silos, is not considered to be of any real advantage.

The method of emptying a silo will be determined by whether the silo is erected on a stand or whether the outlet chute is at ground level. In the former case, the grain may be fed directly by gravity to a grader or direct to bags, which can be supported on a small frame. In the latter case, a small pit can easily be dug to allow the filling of bags by gravity, but this method, owing to weight of a filled bag, usually requires two men. Here, again, the advantage of location on a slope will be obvious. Another very satisfactory method where a grader is employed is to construct a shallow tray at the outlet chute and feed the grader with a large hand scoop. Owing to the slowness of the grading operation, this method, which only requires one man, has proved quite economical.

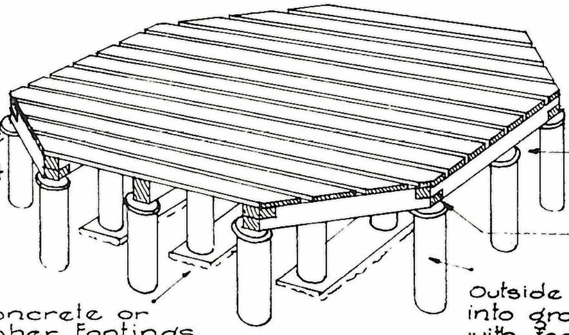
Many authorities consider that grain, if kept for any prolonged period, should be turned over at regular intervals. If this is desired, the use of a blower, as described above, is by far the most suitable method. Tests indicate that a complete turnover cannot be accomplished by circulating in the same silo, and it is therefore advisable, when turning over, to feed from one silo to another.

The dividing of the silo into a number of compartments has been done in numerous instances, but this is not recommended. It may often happen that one compartment is full, whilst another is empty, and this results in very unequal stresses, which tend to open the seams or joins, occasion bulges in the structure, and in some instances, where the silo has not been properly designed, causes a complete collapse.

NOTE.—No matter what endeavours are made to make fittings, such as outlet chutes, rake-holes, etc., completely watertight, a small rain hood should be erected over every such fitting, which definitely ensures that no moisture may enter through this source.

GRAIN SILO FOUNDATIONS

No. 1.—TIMBER STAND FOUNDATION



Stand to be about 3'0" above ground to suit bagging height

24 g. Galv. iron or zincanneal ant caps · projecting min. 1½" & turned down all round.

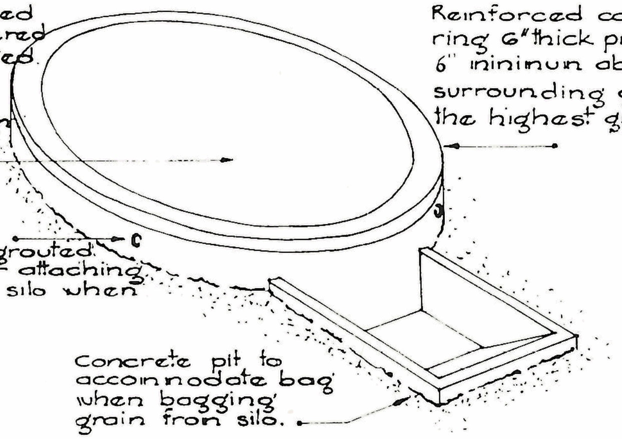
Halve & bolt all bearers at intersections.

Reinforced concrete or Hardwood Timber Footings to distribute load of silo evenly over the ground

Outside posts to be sunk into ground about 1'6" to 2'0" with feet resting on hardwood sole-plates, to distribute load evenly.

All timbers are to be treated with preservative prior to assembling

No. 2.—REINFORCED CONCRETE RING FILLED WITH SAND



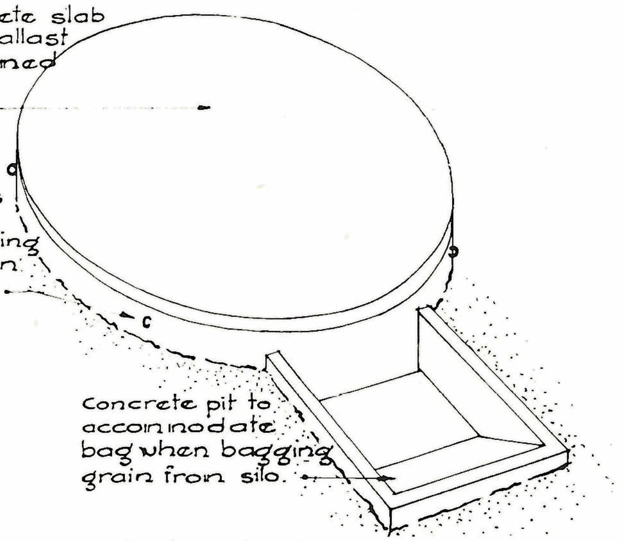
Enclosure to be filled with sand well watered rammed & compacted. Centre is to be left slightly crowned to allow for consolidation under the load of the silo

Reinforced concrete ring 6" thick projecting 6" minimum above the surrounding ground at the highest ground level.

Mild Steel Eyebolts grouted into side of base for attaching wires to hold down silo when this is empty.

Concrete pit to accommodate bag when bagging grain from silo.

No. 3.—REINFORCED CONCRETE SLAB



Reinforced concrete slab 6" thick laid on ballast well watered, rammed & consolidated.

Mild Steel Eyebolts grouted into side of base for attaching wires to hold down silo when empty

Concrete pit to accommodate bag when bagging grain from silo.

FOUNDATIONS

GENERAL.—Before deciding on the type of foundation required, it should be noted that any of the types illustrated may be modified or altered to suit individual requirements. Types 4-7 are illustrated on Sheet 4512B.

(1) TIMBER STAND FOUNDATION.—This stand should be made of good quality hardwood sawn timber, such as Ironbark, Grey, Blue or Spotted Gum, and is only recommended for use on ground having a good bearing value, such as moderately dry clay or good earth. It is generally erected at a height of approximately 3 feet above ground level opposite the outlet chute to suit bagging height. The posts should be round bush timber capped with 26-gauge galvanized iron or uncovered ant trays, with edges turned down all around. The outside posts around the circumference should be sunk into the ground about 18" to 2', with the bottom end resting on suitable footings to distribute the load over the ground. The interior posts should be supported on reinforced concrete or hardwood timber footings for the same purpose. These latter footings should finish at just above ground level. It is very important that all timber be treated with wood preserving oil, such as cuprinol, creosote oil, or other similar preparation. Generally, with all concrete work no weight should be placed on the footing or foundations until at least 14 days after pouring of concrete.

(2) CONCRETE STANDS.—Two alternatives are suggested for this type of foundation.

A reinforced concrete ring about 6" thick and projecting from 6" to 8" above ground level may be used. The outside top corner of the ring should be bevelled to run off water, and the diameter of the ring across the inside of the bevel should be the same as the bottom of the silo. The enclosure formed inside the ring should then be filled with sand or earth well watered and compacted to reduce settlement to a minimum. The centre should be left slightly crowned to allow for any settlement.

Alternatively, the whole of the base could be a reinforced concrete slab from 4" to 6" thick, with corners bevelled off as above, and of similar diameter to suit bottom of silo.

In either of the above cases it will be necessary to concrete four suitable steel eyebolts into the side of the base for attaching tie wires to hold down the silo, and prevent it moving in a strong wind when empty. Where the height of the silo does not allow sufficient room for filling direct from the outlet chute into a bag, a small concrete-lined pit, as illustrated, and deep enough for convenient bagging, is recommended.

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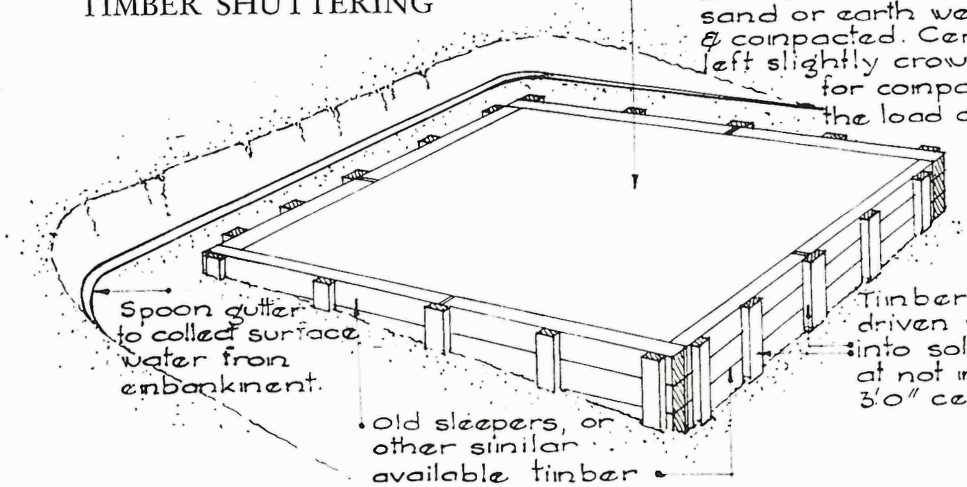
GRAIN SILO FOUNDATIONS

No. 4.—SAND BED ENCLOSED BY TIMBER SHUTTERING



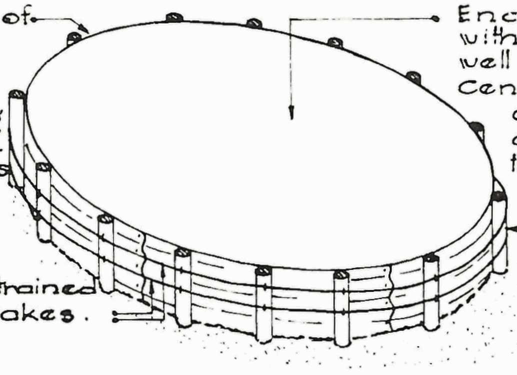
Enclosure to be filled with sand or earth well watered & compacted. Centre is to be left slightly crowned to allow for compacting under the load of the silo.

Spoon gutter to collect surface water from embankment.

Timber uprights driven well down into solid ground at not more than 3'0" centres.

old sleepers, or other similar available timber

No. 5.—SAND BED ENCLOSED BY GALVANIZED IRON RING

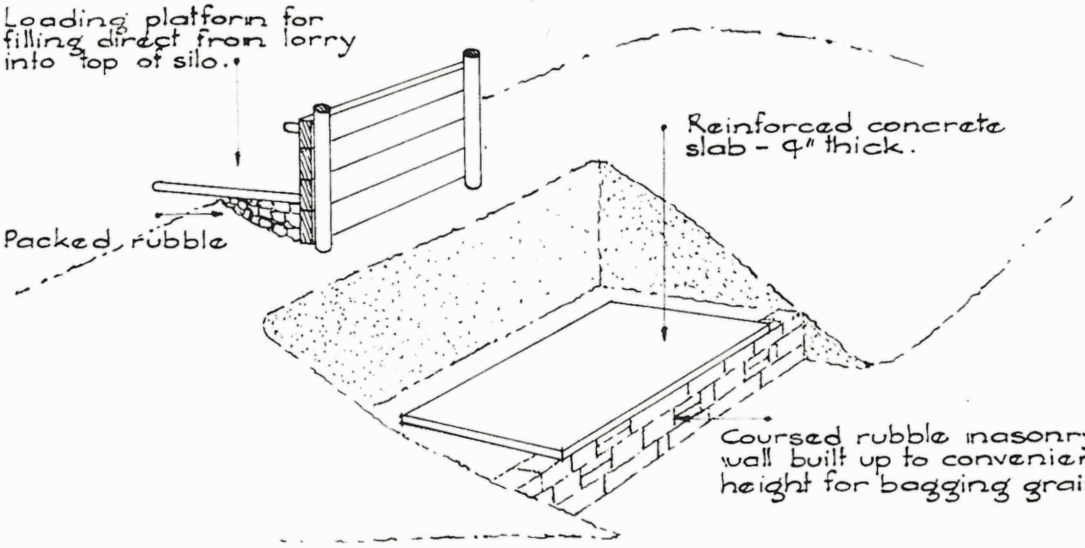


Ring to be formed of corr. galv. iron or zincanneal - one sheet high - let into ground, & projecting 6" to 8" above surface. Secure ring to stakes from the inside with two galv. washered roofing screws at each stake. Two 4g. galv. wires strained round outside of stakes.

Enclosure to be filled with sand or earth - well watered & compacted. Centre to be left slightly crowned to allow for any consolidation under the load of the silo.

Stakes to be driven well down into solid ground at spacing of max. 2'6" centres.

No. 6.—REINFORCED CONCRETE SLAB



Loading platform for filling direct from lorry into top of silo.

Reinforced concrete slab - 4" thick.

Packed rubble

Coursed rubble masonry wall built up to convenient height for bagging grain.

FOUNDATIONS (Contd.)

GENERAL.— Before deciding on the type of foundation required, it should be noted that any of the types illustrated may be modified or altered to suit individual requirements. Types 1-3 are illustrated on Sheet 4512A.

(4) SAND BED.— Two alternatives are suggested for this type of foundation.

A sand bed enclosed by timber is formed by strongly pegging out an area with old sleepers or other available timber to a height of from 4" to 6" above ground-level. Stout stakes driven well down into solid ground and spaced not more than 3' apart should be used for holding the framework in place. The whole of the enclosed area should then be filled with sand or earth well watered and compacted to reduce settlement to a minimum. The centre should be left slightly crowned to allow for any settlement.

(5) ALTERNATIVELY, the framework can be formed by using a ring of corrugated galvanized iron sheets one sheet high. This should be let into the ground so as to project from 6" to 8" above the surface. Stout stakes should then be driven well down into solid ground around the outside of the ring at a distance of not more than 2' 6" apart. The iron ring should be secured to the stakes from the inside by means of two galvanized roofing screws and washers to each stake. Finally, two No. 4 gauge galvanized wires should be strained around the outside of the stakes and fixed thereto with staples. The area thus enclosed should then be filled with sand or earth well watered and compacted to reduce settlement to a minimum. The centre should be left slightly crowned to allow for any settlement.

(6) REINFORCED CONCRETE SLAB.— The arrangement illustrated overleaf shows an ideal location for a silo, a position, however, which is not readily obtainable on the average farm, especially on the plains. Where it is possible, we strongly recommend adopting this arrangement, as the filling operation is merely a matter of emptying bags from the back of a lorry on the hill into a chute which gravitates the grain into the top of the silo. It should be possible, by means of a swinging chute, to fill three silos in this way from the one place. The side of the bank should be excavated as shown, leaving a bench about 3' high at the front to suit bagging height. Along the front of this bench a stone retaining wall should be built, and then the necessary foundation for the silo made by laying down a reinforced concrete slab about 4" thick, which should also be used as the bottom of the silo if desired, provided that, when thoroughly dry, the concrete is coated with hot bitumen and then covered with 3-ply malthoid.

AN ALTERNATIVE FOUNDATION, where plenty of stones are available, is to construct a raft of at least two layers of stones bonded together with cement, and the whole floated over with cement mortar to a good level surface.

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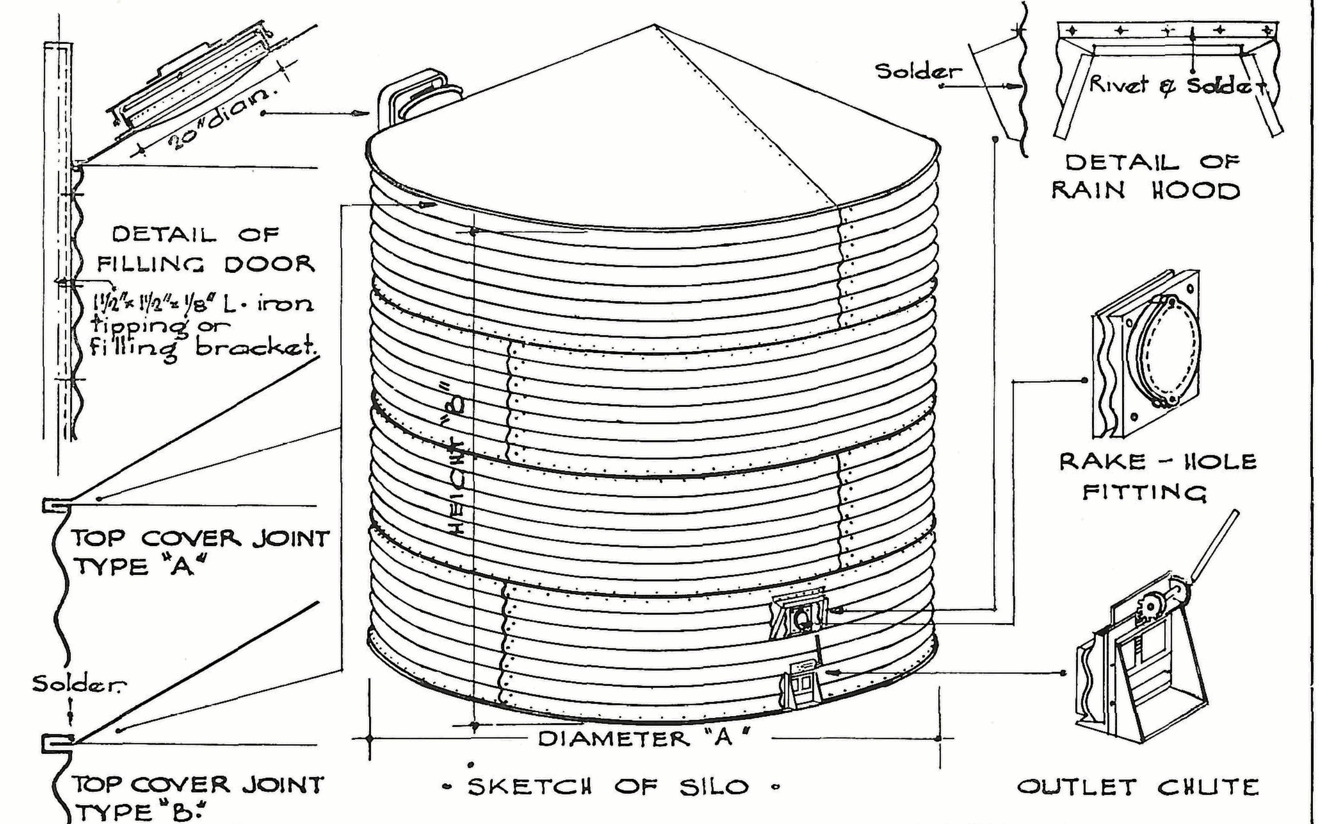
SILO SECTION

LYSAGHT'S
COUNTRY SERVICE

SHEET 4514A

CORRUGATED GALVANIZED IRON GRAIN SILO — TANK TYPE



CAPACITY IN BUSHELS	NUMBER OF 3-BUSHEL BAGS	DIAMETER "A"	HEIGHT "B"	APPROX. WEIGHT OF SHEETS
1000	333	13' 6"	8' 0"	·42 TON
1500	500	16' 3"	8' 0"	·55 "
2000	667	17' 0"	10' 0"	·65 "

MATERIALS.— Wall sheets are to be of 22 or 24 gauge "Orb" brand corrugated galvanized iron or Zincanneal, curved to suit required diameter of silo. Roof sheets and bottom are to be of 24 gauge "Queen's Head" or Zincanneal plain sheets. In 1,500 and 2,000 bushel silos, roof sheets are to be 22 gauge.

Cover and filling holes are to be of 24 gauge plain iron with edge turned over $\frac{3}{16}$" wire bead. Two handles are to be of $1\frac{1}{2}$" x 14 gauge galvanized strap iron and fitted to covers. Rain hood over outlet chute, 24 gauge.

RIVETING.—All horizontal joints of wall sheets are to have a single lap with all inside edges of sheets looking down. Joints are to be riveted with $\frac{3}{16}$" galvanized tank rivets with washers inside. Space rivets at 6" pitch. All vertical joints of wall sheets are to be given from 4" to 6" lap, according to sheets, and riveted with two rows of $\frac{3}{16}$" galvanized tank rivets and washers at 3" pitch. Rows to be staggered.

Plain iron roof and bottom sheets are to be lapped $1\frac{1}{2}$" and riveted with No. 9 tinned tinmen's rivets, spaced at 2" pitch.

Rivets in filling-hole flashing and rain hood are to be No. 9 tinned tinmen's rivets, spaced at 3" pitch.

SOLDERING.— All external edges of wall sheets, in both horizontal and vertical joints, are to be soldered. All rivet heads, external edges of roof and bottom sheets, filling-hole flashing, and junction of rain hood with walls to be soldered. At junction of wall with bottom, edge of bottom ring is to be flanged out, bottom sheets turned up and over, flattened and soldered.

Junction of wall with top to be as shown—detail "A" or detail "B" above.

GENERALLY.— The whole of the above work to be carried out according to the best tank-making practice to make the silo as airtight as possible for fumigating purposes.

FITTINGS.— Cast iron rake-hole and outlet-chute fittings are supplied corrugated to suit the iron, and bolted on with waterproof sarking felt joint. Galvanized rain hood is provided to run water off above outlet fittings. Angle iron tipping or filling bracket is provided on small silos, and loading platform on larger silos for filling bag wheat into silo.

Mild steel external and internal ladders are provided for access to the inside of the silo only if desired.

SILO SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4514A

MATERIAL REQUIRED FOR TANK TYPE SILOS

1,000 BUSHEL SIZE

GALVANIZED IRON:
12 Sheets—8' x 24 G. "Orb" Quality Corrugated Curved to 1/6 of circle.
12 „ —7' x 24 G. "Orb" Quality Corrugated Curved to 1/6 of circle.
(3/8' and 3/7' Sheets per Circle.)
10 „ —6' x 36" x 24 G. Queen's Head" Plain Iron for Bottom.
12 „ —6' x 36" x 24 G. "Queen's Head" Plain Iron for Conical Top.
1 Sheet —6' x 36" x 24 G. "Queen's Head" Plain Iron for filling hole and rain hood.

RIVETS:
4½ Gross $\frac{3}{16}$" Galvanized Tank Rivets and Washers.
8 Gross No. 9 Tinned Tinmen's Rivets.

SOLDER:
35 lbs. 50/50 Solder.

FITTINGS:
1—Galvanized Iron Filling Hole and Cover complete with two handles.
1—Galvanized Iron Rain Hood.
1—M.S. Tipping or Filling Bracket made from 1½" x 1½" x ⅛" L.—5' long approx.
1—C.I. Outlet Chute complete with Bolts and Felt Joint.
1—C.I. Rakehole Fitting complete with Bolts and Felt Joint.
4—1" x ⅜" Hex. Bolts with lead Grummits under heads.

1,500 BUSHEL SIZE

GALVANIZED IRON:
20 Sheets—8' x 24 G. "Orb" Quality Corrugated Curved to 1/7 of circle.
8 „ —7' x 24 G. "Orb" Quality Corrugated Curved to 1/7 of circle.
(5/8' and 2/7' Sheets per Circle.)
14 „ —6' x 36" x 24 G. "Queen's Head" Plain Iron for Bottom.
16 „ —6' x 36" x 22 G. "Queen's Head" Plain Iron for Conical Top.
1 Sheet —6' x 36" x 24 G. "Queen's Head" Plain Iron for filling hole and rain hood.

RIVETS:
5 Gross $\frac{3}{16}$" Galvanized Tank Rivets and Washers.
10 Gross No. 9 Tinned Tinmen's Rivets.

SOLDER:
40 lbs. 50/50 Solder.

FITTINGS:
1—Galvanized Iron Filling Hole and Cover complete with two handles.
1—Galvanized Iron Rain Hood.
1—M.S. Tipping or Filling Bracket made from 1½" x 1½" x ⅛" L.—5' long approx.
1—C.I. Outlet Chute complete with Bolts and Felt Joint.
1—C.I. Rakehole Fitting complete with Bolts and Felt Joint.
4—1" x ⅜" Hex. Bolts with lead Grummits under heads.

2,000 BUSHEL SIZE

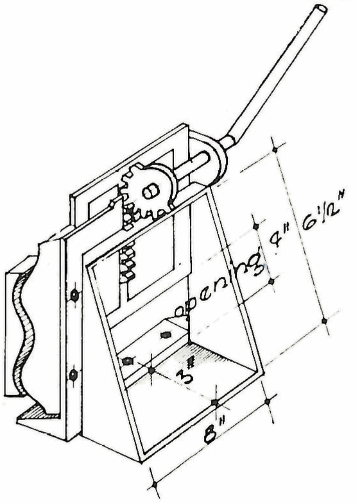
GALVANIZED IRON:
28 Sheets—8' x 24 G. "Orb" Quality Corrugated Curved to 1/7 of circle.
7 „ —8' x 22 G. "Orb" Quality Corrugated Curved to 1/7 of circle.
(7/8' Sheets per Circle.)
14 „ —6' x 36" x 24 G. "Queen's Head" Plain Iron for Bottom.
16 „ —6' x 36" x 22 G. "Queen's Head" Plain Iron for Conical Top.
1 Sheet —6' x 36" x 24 G. "Queen's Head" Plain Iron for filling hole and rain hood.

RIVETS:
6½ Gross $\frac{3}{16}$" Galvanized Tank Rivets and Washers.
11 Gross No. 9 Tinned Tinmen's Rivets.

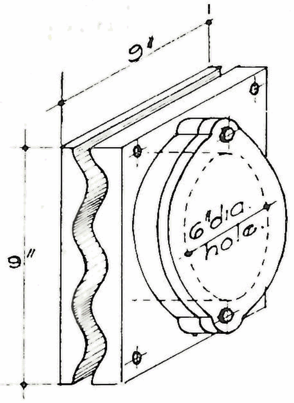
SOLDER:
48 lbs. 50/50 Solder.

FITTINGS:
1—Galvanized Iron Filling Hole and Cover complete with two handles.
1—Galvanized Iron Rain Hood.
1—M.S. Tipping or Filling Bracket made from 1½" x 1½" x ⅛" L.—5' long approx.
1—C.I. Outlet Chute complete with Bolts and Felt Joint.
1—C.I. Rakehole Fitting complete with Bolts and Felt Joint.
4—1" x ⅜" Hex. Bolts with lead Grummits under heads.

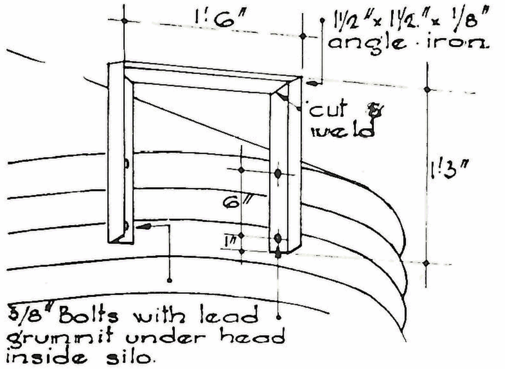
ACCESSORIES FOR TANK TYPE SILOS



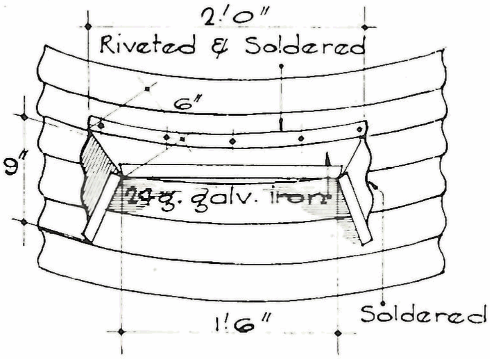
A.—OUTLET CHUTE



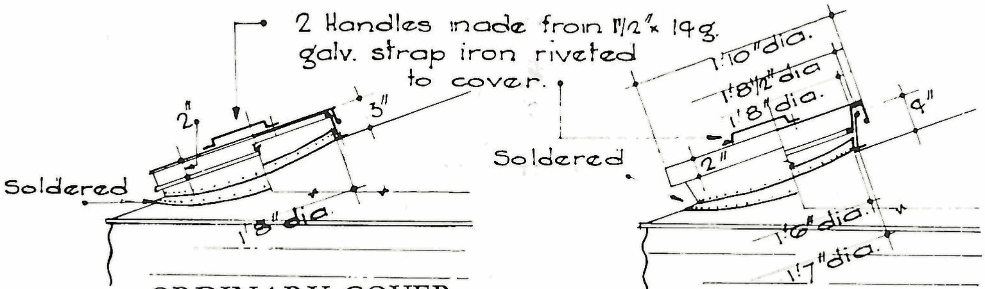
B.—RAKE-HOLE FITTING


1'6"
1½" x 1½" x ⅛" angle iron.
cut & weld
1'3"
6"
1"
⅜" Bolts with lead grummit under head inside silo.

C.—TIPPING OR FILLING BRACKET

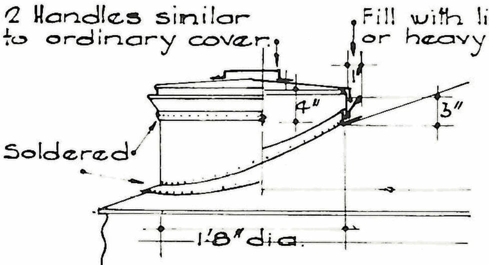


D.—RAIN HOOD



ORDINARY COVER

TAPERED COVER


2 Handles similar to ordinary cover.
Fill with light grease or heavy oil.
1"
4"
3"
Soldered
1'8" dia.

AIR-TIGHT COVER

E.—DIFFERENT TYPES OF COVER AND FILLING HOLE

Material · 24 gauge plain galv. iron.

Rivets · No 9 tinned tinmen's at 3" pitch. All rivet heads soldered.

LYSAGHT'S COUNTRY SERVICE

ACCESSORIES FOR TANK TYPE SILOS

(A) **THE OUTLET CHUTE** is made of cast iron shaped to fit the corrugated sheets of the silo walls. It is attached to the silo by means of bolts, which also pass through cast iron corrugated back pieces fitted inside the silo. A waterproof sarking felt joint should be inserted between the outside of the silo and the corrugated portion of the chute. The flow of grain is readily regulated by means of the sliding gate, operated by the rack and pinion. One, or sometimes two outlet chutes are fitted to the silo.

(B) **THE RAKE-HOLE FITTING** is also made of cast iron in two halves, with outside and inside surfaces shaped to fit the corrugated sheets of the silo walls. It is usually fitted in a position just above the outlet chute, and is attached to the silo by means of bolts; a waterproof sarking felt joint similar to that for the outlet chute should also be used. As many rake-hole fittings as desired may be fitted to the silo.

(C) **THE TIPPING OR FILLING BRACKET** is made from $1\frac{1}{2}$" x $1\frac{1}{2}$" x $\frac{1}{8}$" mild steel angle iron, cut, bent to shape, and welded. It is fitted to the top portion of the silo walls opposite the filling hole, by means of four $\frac{3}{8}$" bolts with lead or other suitable grummits underneath the bolt-head inside the silo, in order to prevent moisture leaking through the bolt hole into the silo. This bracket is used for resting a bag of grain on while tipping into the silo.

(D) **THE RAIN HOOD** is made of 24 gauge plain galvanized iron to the shape illustrated. The sides are cut to the contour of the corrugations of the silo wall sheets and soldered along the edges. The top is fixed with rivets with heads soldered, and then soldered along the top edge, so that the whole of the edges joining the rain hood to the silo are watertight. The sides and top are splayed inwards, and the front edges are cut and turned up in order to run water off clear of the fittings to be protected. A rain hood should be fitted immediately above every fitting so as to ensure that no moisture may enter the silo. The use of these is definitely recommended.

(E) **THE COVER AND FILLING HOLE** is made of 24 gauge plain galvanized iron, and three alternative types are shown. Generally their construction should be similar to standard tank-making practice. The ordinary type of cover shown has the lid fitting outside the walls of the filling hole, and is not recommended where an airtight job is required. The tapered type has a lid with tapered walls fitting down inside the walls of the filling hole, and a weather ring around the outside. This type should be reasonably airtight. The type shown as airtight is adapted from the drawings of the Department of Agriculture, and has the lid fitting down into a grease-filled trough around the outside of the filling hole walls. It will be necessary, of course, in this type to keep the filling hole vertical, while in the other two types it may be at right angles to the slope of the roof. If the airtight type is used, it might necessitate making the tipping bracket a little higher to facilitate filling operations.

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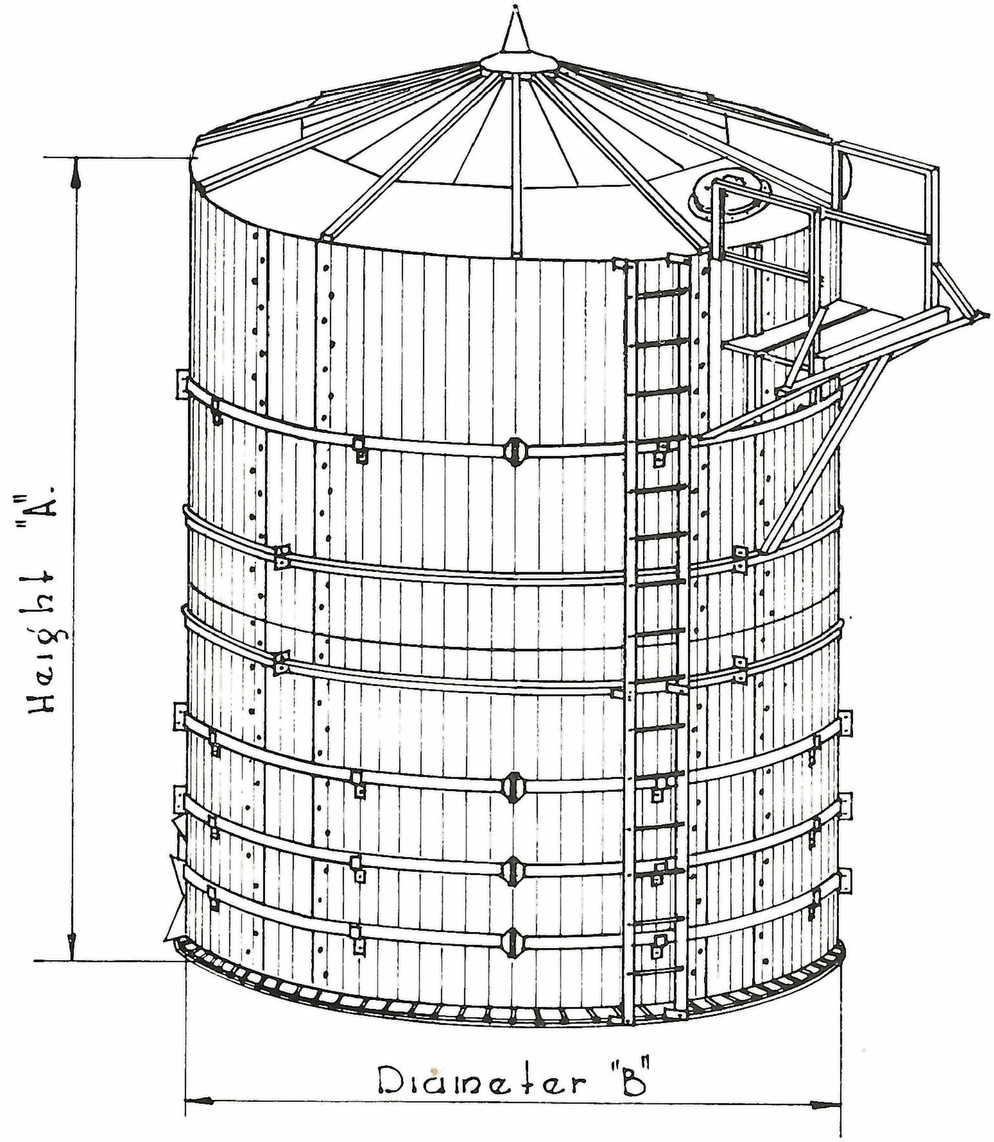
VERTICAL SHEET TYPE GRAIN SILO



Number of 3 Bushel Bags	Capacity in Bushels	Height. "A"	Approx. Diameter "B"	Approx. weight of Sheets.	Total Number of Bands	Approx. Weight of Steelwork.
800	2400	13'·6"	16'·9"	·615 t.	7.	·3 tons
1000	3000	13'·6"	19' 0"	·75 t.	7.	·333 "
1200	3600	15'·6"	19'·0"	·947 t.	8.	·375 "
1400	4200	14'·6"	21'·6"	1·086 t.	7.	·366"

† = Weight in Tons.

SILO SECTION

LYSAGHT'S
COUNTRY SERVICE

SHEET 4517A

MATERIALS REQUIRED FOR VERTICAL SHEET TYPE SILO

GENERAL.—This type of silo is constructed with the sheets placed vertically, thus ensuring immediate drainage of water to the bottom, and also obviating the necessity for curving the sheets. The lateral pressure of the grain is transferred by the wall sheets to a number of steel bands encircling the outside of the walls. The silo is moisture, bird and vermin-proof, and at the same time is practically airtight for fumigation purposes. It is built in a number of sections for easy transport, and the heaviest section of the largest silo does not exceed about 150 lbs. All mating parts should be match-marked, and hence assembly becomes quite a simple job. If required, external and internal steel ladders are provided for access to the silo, and a landing platform may be constructed adjacent to the filling hole for operations when emptying bags after being hoisted up to this level.

THE WALLS are generally made of 26 gauge "Red Orb" galvanized corrugated iron sheets, but in the two larger silos the bottom section of the wall is 22 gauge "Orb" quality, and the top section 26 gauge "Red Orb." The sections of wall are three sheets wide, and the sheets are given 1½ laps along the sides. The laps are either spot welded or riveted with a double row of rivets. A loose sheet is left between each section, and this sheet is fitted during assembly by means of a double row of bolts each side, a waterproof felt joint being used between the laps. A number of steel bands encircle the wall sheets, the top, bottom and middle two being of angle iron section, and the others flat iron. The angle iron bands are supplied in sections, the top and two middle ones being bolted to the wall sheets, while the bottom one is attached to the sheets by means of hook bolts during erection. The flat bands are usually supplied in four sections, wrapped around the walls after erection, and joined by bolts through brackets on the ends of the band sections. They are held in position by specially shaped clips bolted to the silo wall.

THE ROOF is made of 24 gauge "Queen's Head" plain galvanized iron in sections, cut to the required shape and supported on a timber framework. The sheets are supported in between the timber rafters by a series of concentric pipe hoops notched into the top of each rafter. The sheets are lapped over on top of each rafter and held down by cover battens securely screwed through into the rafters. The apex is finished off by means of a flashing cone, and the edges of the roof sheets around the circumference are turned down over the edge of the top angle iron band, and hammered up on the under side of it, thus making a perfectly watertight roof.

THE BOTTOM is made of 26 gauge "Queen's Head" plain galvanized iron, and is similar in construction to an ordinary tank bottom. The edges are carried up the inside of the silo wall about 2" by means of a special construction, thus preventing moisture from entering the silo.

FITTINGS.—Cast iron Rake Hole and Outlet Chute fittings are supplied corrugated to suit the iron, and bolted on with a waterproof felt joint between the fittings and the wall. A galvanized iron rain hood is riveted and soldered to the wall sheet above the Rake Hole fitting, to run off any water and prevent moisture getting into the silo. Landing platform and ladders are only provided if required.

NOTE.— Ask for detailed drawings of these silos when required for actual construction purposes.

ITEM	MATERIAL	QUANTITY REQUIRED			
		800 BAGS 2,400 Bushels	1,000 BAGS 3,000 Bushels	1,200 BAGS 3,600 Bushels	1,400 BAGS 4,200 Bushels
Wall Sheets	22 Gauge 8/3" Orb Corr. Galv. Iron			32-7ft.	36-6ft.
	26 " " Red Orb Corr. Galv. Iron	56-7ft.	64-7ft.	32-9ft.	36-9ft.
Roof Sheets	6' 0" x 36" x 24 Gauge Queen's Head Plain Galv. Iron ..	20			
	6' 0" x 30" x 24 " " " " " " ..		12	12	
	6' 0" x 48" x 24 " " " " " ..		12	12	
	7' 0" x 48" x 24 " " " " " " ..				12
	8' 0" x 36" x 24 " " " " " " ..				12
Bottom Sheets ..	6' 0" x 36" x 26 " " " " " " ..	14	19	19	25
Vert. Edging	6' 0" x 36" x 24 " " " " " " ..	2			
For Bottom	6' 0" x 48" x 24 " " " " " " ..		2	2	
Accessories, etc. ..	7' 0" x 48" x 24 " " " " " ..				2
Clips	1¼" x 16 Gauge Galv. Hoop Iron	8ft. makes 21	9ft. makes 24	12ft. makes 32	10' 6" makes 27
Angle Iron Bands .	1½" x 1½" x ⅛" Angle Iron	4in. 7 sections = 211 Lin. ft.	4in. 8 sections = 241 Lin. ft.	4in. 8 sections = 241 Lin. ft.	4in. 9 sections = 271 Lin. ft.
Flat Iron Bands ..	1½" x 3/16" M.S. Flat	3in. 4 sections = 158 Lin. ft.	3in. 4 sections = 181 Lin. ft.	4in. 4 sections = 241 Lin. ft.	3in. 4 sections = 203 Lin. ft.
Joint Brackets ..	2" x 2" x ¼" Angle Iron	12ft.	12ft.	15ft.	12ft.
Joint Plates	1¾" x ¼" M.S. Flat	14ft.	16ft.	16ft.	18ft.
Support Hoops for Roof Sheets ..	½" Galvanized Water Pipe	3 Hoops = 85 Lin. ft.	4 Hoops = 135 Lin. ft.	4 Hoops = 135 Lin. ft.	5 Hoops = 194 Lin. ft.
Cover Battens ..	2" x 1" Oregon	10- 9 ft.	12-10ft.	12-10ft.	12-12ft.
Rafters	3" x 2" Hardwood	10- 9 ft.	12-10ft.	12-10ft.	12-12ft.
Collar Ties	3" x 2" "	2-10 ft.	2-13ft.	2-13ft.	2-14ft.
Trimmers	3" x 2" "	1-13 ft.	1-13ft.	1-13ft.	1-14ft.
Apex Block	Cut from 8" x 8" Hardwood, 6" Long	1-10 Sided	1-12 Sided	1-12 Sided	1-12 Sided
Galv. Hook Bolts .	¼" dia. x 2" Long Shank with Lead and Iron Washers	6 Dozen	7 Dozen	7 Dozen	8 Dozen
Galv. Roofing Bolts	¾" x ¼" Galv. Roofing Bolts and Nuts	1 Gross	1¼ Gross	1¼ Gross	1½ Gross
	½" x 3/16" " " " " "	4½ Gross	5¼ Gross	6 Gross	6½ Gross
Solder	50-50 Solder	11 lbs.	13 lbs.	13 lbs.	18 lbs.
Bolts	1½" x ⅝" Black Hex. Bolts and Nuts	60	65	73	70
	1½" x ½" " " " " "	7	8	8	9
	3½" x ⅜" Black Cup Head Bolts and Nuts	18	20	20	20
Nails, etc.	3" x No. 8 Gauge Nails	1 lb.	1 lb.	1 lb.	1 lb.
	2" x No. 10 " "	1 lb.	1 lb.	1 lb.	1 lb.
	¾" x No. 12 " Galv. Clouts	1 lb.	1 lb.	1 lb.	1 lb.
Felt Packing	Waterproof Felt Strips, 4" wide	14 Strips, 13' 6" long	16 Strips 13' 6" long	16 Strips 15' 6" Long	18 Strips 14' 6" long
	Sundry Packings for Fittings	1 Sq. Yard	1 Sq. Yard	1 Sq. Yard	1 Sq. Yard
Fittings	Cast Iron Outlet Chute, complete with Bolts	1	1	1	1
	Cast Iron Rake Hole, complete with Bolts	1	1	1	1
Tinmen's Rivets ..	No. 9 Tinned Tinmen's Rivets	5 Gross	8½ Gross	8½ Gross	9 Gross
Extra Rivets if Wall Sheets are riveted	" " " " "	4½ Gross	5¼ Gross	6 Gross	6½ Gross

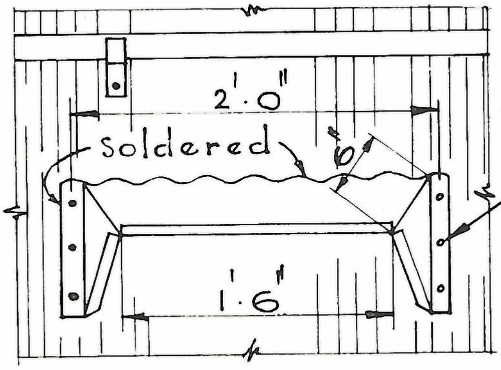
NOTE.—Spot Welded Wall Sheets—Ladders and Heading Platform NOT included.

SILO SECTION

LYSAGHT'S
COUNTRY SERVICE

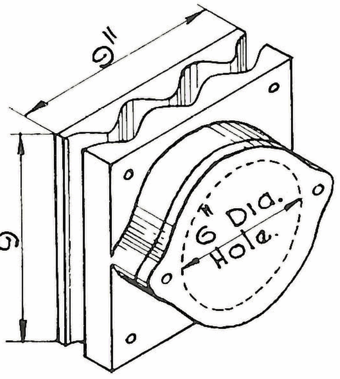
SHEET 4517B

ACCESSORIES FOR VERTICAL SHEET TYPE SILOS

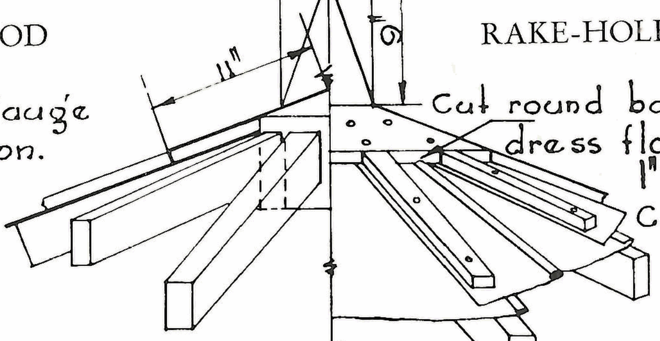


RAIN HOOD

Material 24 gauge plain Galv. Iron.

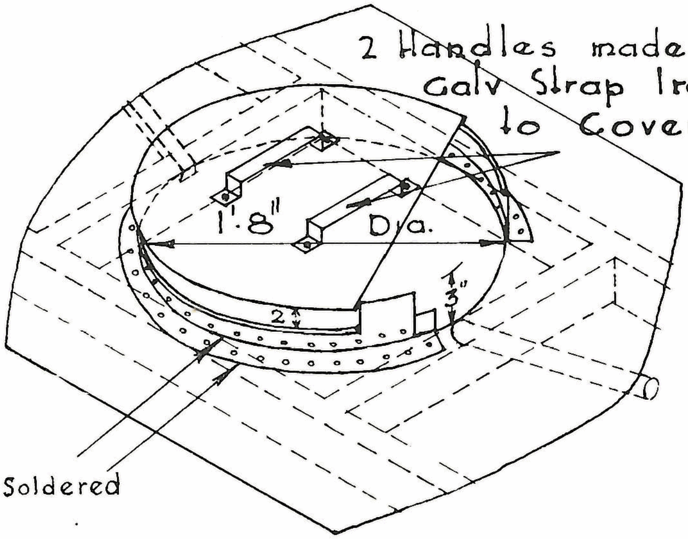


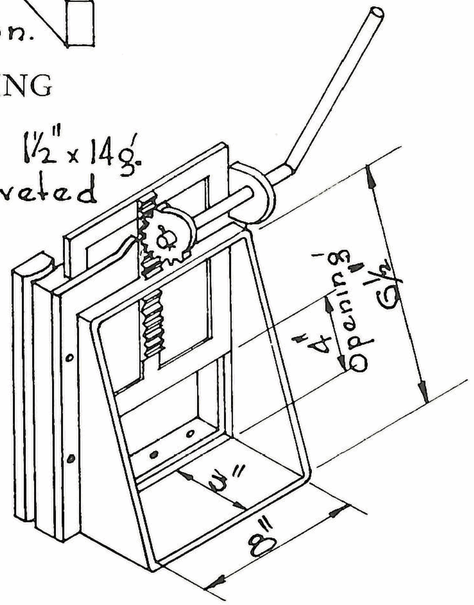
RAKE-HOLE FITTING


6" Dia.
6"
11"
Cut round battens and dress flashing down 1" between Cover battens.

Material 24 gauge plain Galv. Iron.

APEX FLASHING


2 Handles made from 1½" x 14g. Galv Strap Iron riveted to Cover.
1' 8" Dia.
2"
3"
Soldered



OUTLET CHUTE

COVER AND FILLING HOLE

Material 24 gauge plain Galv. Iron.
Rivets No.9 tinned tinmens about 3" pitch.
All rivet heads soldered.

SILO SECTION

LYSAGHT'S
COUNTRY SERVICE

SHEET 4517B

ACCESSORIES FOR VERTICAL SHEET TYPE SILOS

THE OUTLET CHUTE is made of cast iron shaped to fit the corrugated sheets of the silo walls. It is attached to the silo by means of bolts, which also pass through cast iron corrugated back pieces fitted inside the silo. A waterproof sarking felt joint should be inserted between the outside of the silo and the corrugated portion of the chute. The flow of grain is readily regulated by means of the sliding gate, operated by the rack and pinion. One, or sometimes two, outlet chutes are fitted to the silos.

THE RAKE-HOLE FITTING is also made of cast iron in two halves, with outside and inside surfaces shaped to fit the corrugated sheets of the silo walls. It is usually fitted in a position just above the outlet chute, and is attached to the silo by means of bolts. A waterproof sarking felt joint similar to that for the outlet chute should also be used. As many rake-hole fittings as desired may be fitted to the silo.

THE RAIN HOOD is made of 24-gauge plain galvanized iron to the shape illustrated. The top is cut to the contour of the corrugations of the silo wall sheets and soldered along the edges. The sides are fixed with rivets with heads soldered, and then soldered along the outside edges, so that the whole of the edges joining the rain hood to the silo are watertight. The sides and top are splayed inwards, and the front edges are cut and turned up in order to run water off clear of the fittings to be protected. A rain hood should be fitted immediately above every fitting so as to ensure that no moisture may enter the silo. The use of these is definitely recommended.

THE APEX FLASHING is made of 24 gauge plain galvanized iron to the shape of a witch's hat, and is fitted over the top of the cover battens. The outside edge around the circumference is cut out to correspond with the cover battens, and the edges dressed down 1" in between the battens. The flashing is secured to the cover battens by means of galvanized clouts as illustrated.

THE COVER AND FILLING HOLE is made of 24 gauge plain galvanized iron, and has the lid fitting outside the wall of the filling hole. The flashing is secured to the roof sheet by means of rivets, and the whole soldered up according to best tank-making practice to make a thoroughly watertight job.

NOTE.—Very satisfactory outlet chutes can be made from heavy gauge galvanized sheet.

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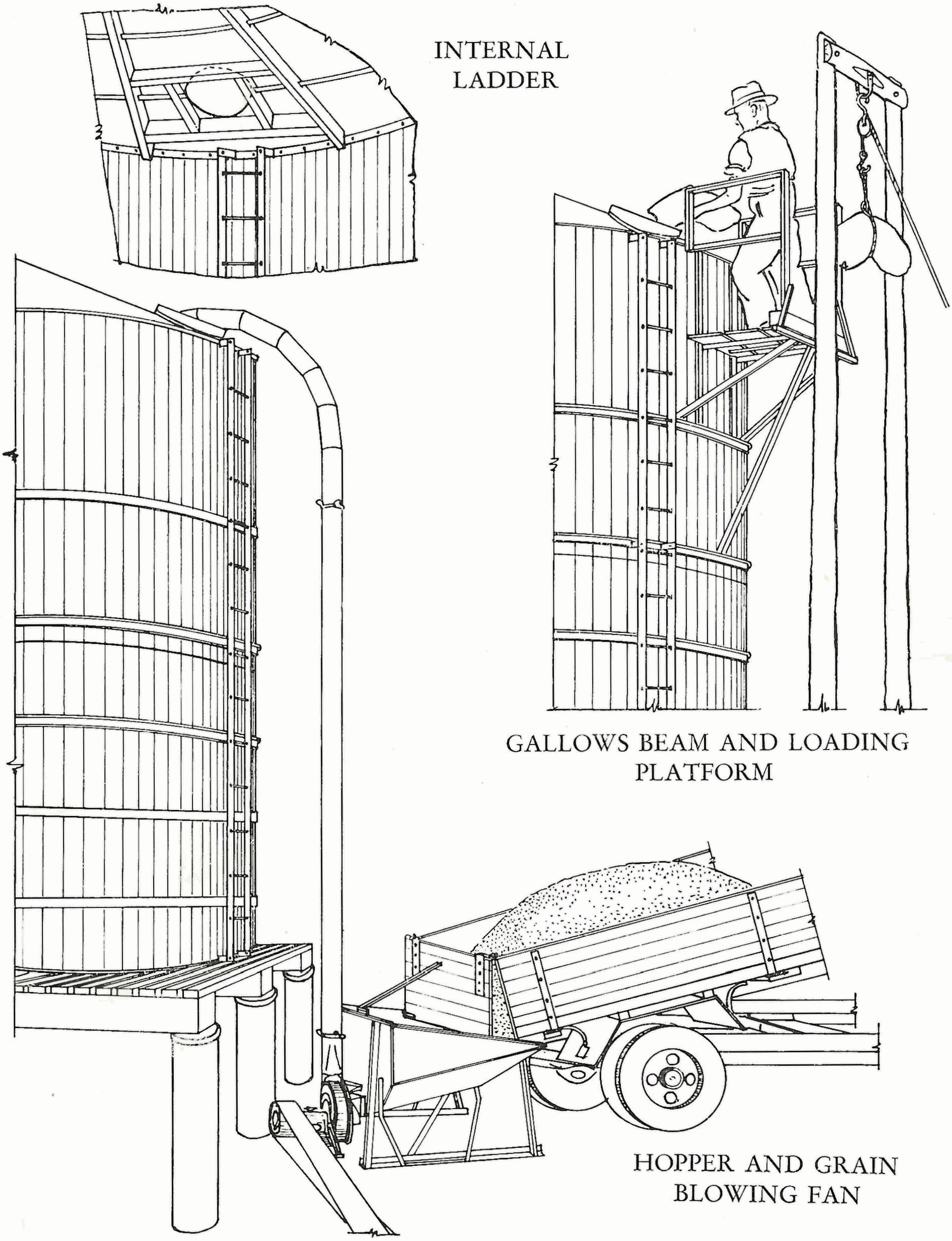
SILO SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4517C

ACCESSORIES FOR VERTICAL SHEET TYPE SILOS



INTERNAL LADDER

GALLOWS BEAM AND LOADING PLATFORM

HOPPER AND GRAIN BLOWING FAN

ACCESSORIES FOR VERTICAL SHEET TYPE SILOS

GENERALLY.— The following accessories are not standard equipment with the silos, and are only supplied on request.

LADDERS are of light steel construction, and are provided externally for access to the filling hole or platform, and internally to enable the operator to get down inside the silo for the final emptying process, or for inspection purposes. They are attached to the silo by means of suitable brackets, which are welded to the top and bottom angle iron bands.

GALLOWS BEAM AND LOADING PLATFORM.—This is probably the cheapest method of filling the silo, but also the slowest. A steel-framed platform built of angle iron with a timber decking is constructed on the side of the silo wall adjacent to the filling hole. The operator is safeguarded from falling by means of suitably designed handrails on both sides of the platform and a timber foot stop across the front. A gallows beam consisting of two stout timber poles with a rigid cross beam on top should be erected in front of the loading platform. Sufficient headroom should be provided above the decking to allow for a bag of grain or hoisting bucket to be elevated high enough to land on the platform. A block and tackle should be fixed to the cross beam and the hoisting accomplished either by means of a small hand-winch, which is rather a slow method, or, alternatively, by means of a horse, lorry, light tractor, or even man-power. The bags of grain may be hoisted direct to the platform and then manually emptied into the silo, or the grain may be emptied from the bags into a bucket on the ground, and then hoisted up as before.

HOPPER AND GRAIN-BLOWING FAN.— By this method, the grain is elevated entirely by mechanical means, but is only satisfactory if the height from the blower to the point of discharge into the silo does not exceed 20 feet. At any greater height the grain is liable to be damaged. The grain is transported to the silo in bulk or in bags as desired, and emptied into a steel plate feeding hopper, from whence the feed to the blower is readily controlled by means of a sliding door, operated by a lever. The blower casing and impeller are of mild steel plate construction, mounted on a cast iron supporting frame, and the unit is belt-driven at a speed of 1,000 r.p.m. by means of a tractor, oil engine, or electric power, if available. The delivery pipe from the blower is of light steel plate construction, and delivers the grain direct to the filling hole in the silo roof. The pipe diameter is about $5\frac{3}{4}$", and care should be taken that there are a minimum of bends, and that the pipe is air-tight. This equipment will handle about 600 bushels an hour. Detailed drawings and particulars of the above unit are obtainable from this Company.

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LYSAGHT'S
COUNTRY SERVICE

POULTRY SECTION

LYSAGHT
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JOHN LYSAGHT (AUST.) PTY. LTD.

FOREWORD

Permanent and durable buildings are an important consideration for any Poultry Farm, and the ultimate success of any property depends on fully exploiting a good site with well-constructed and properly planned buildings. From a housing point of view, the principles are the same for backyard, sideline and specialised Poultry Farming. This Section deals with Poultry as a specialised industry.

Poultry farms vary from the large hatchery and intensive holding type to the small 1,000-layer proposition. The number of structures by type, depends upon the farmer's system of operation, that is, whether he purchases day-old chickens, three-weeks-old chickens, or four to five-months-old pullets. No more satisfactory material than Galvanized Iron has yet been found to sheet the framework of buildings, whether they be of sawn timber or prefabricated steel.

In addition to playing an important part in the outside sheeting of buildings, a large variety of internal fittings, machines, etc., are made from Galvanized Iron. Typical of these on the large scale are silos for holding grain, tanks for holding water, and battery brooders.

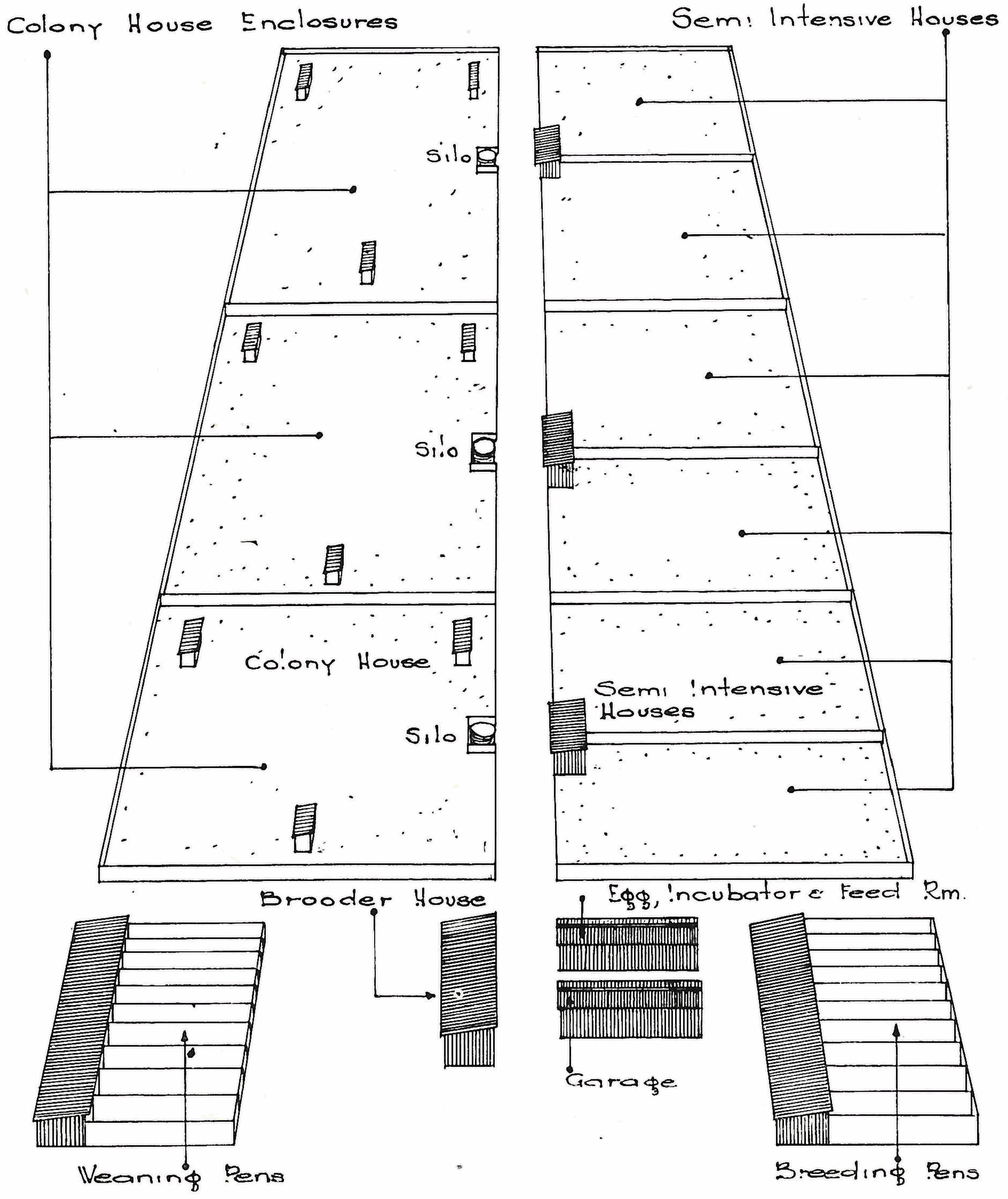
In the smaller requisites for feeding and watering can be found self-feeders for grain, mash, shell grit, etc., made from Queen's Head Galvanized Sheet, and devices for automatic feeding of water.

In choosing a suitable height for a poultry shed, the standard lengths of Corrugated Iron should be considered. Thus, for buildings with spans up to 10', 5' sheets are used at the rear and 6' at the front. For spans up to 20'-22', 6' sheets are used at the rear, and 8' sheets at the front. Wall sheeting should be of complete lengths of Lysaght's Galvanized Iron, 6', 7', 8' or 9' lengths. For roofing, sheets are available in lengths from 5' to 12'.

This Section, though included as part of the Country Service Manual, will be supplied on request as a separate brochure. Any special problem can be referred to Lysaght's Service Department, where a designing staff will be only too pleased to carry out a full investigation.

LYSAGHT'S
COUNTRY SERVICE

PERSPECTIVE VIEW OF POULTRY FARM LAYOUT



POULTRY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4612A

LAYOUT OF POULTRY FARM — PERSPECTIVE

ASPECT.— The ideal site is elevated land with a gradual slope towards the east or north, the slope being sufficient for good drainage, yet not too steep as to make the erection of buildings difficult or to cause soil erosion. Sites exposed to cold winds are undesirable, as fowls have a decided objection to wind, and though these may be protected by tree wind-breaks, tall trees should not shade the house. All open-front sheds, either for young stock or adults, should face the north, or as near north as possible, the fullest advantage being gained by the drying and sterilising powers of sunshine.

SOIL.— All other criteria being equal, sand or sandy soil is preferable, but the choice of such soil is limited, and for this reason most commercial poultry farms are located on heavy loamy land. On the latter, however, the soil should have a depth of 9"-12" before reaching clay.

PLANNING.— For satisfactory operation of a poultry farm it should be equipped with the following buildings:—

1. Brooder House provided with ample warmth for rearing young chickens.
2. Weaning Pens, to which the chickens may be transferred after they leave the brooder.
3. Colony Houses for raising the pullets.
4. Laying Houses.
5. Breeding Pens.
6. Feed Shed.
7. An Egg Storage and Packing Room.

Where the poultry farmer has his own incubator room, a suitable structure is that described in Sheet 4622, combining the functions of egg room, incubator and feed room. One of the first considerations in planning the farm is to have the incubator room and brooder house close to the residence on account of the regular attention that is necessary to give the above structures in the rearing season, both during the day and before retiring at night.

It is important that the pens for the young stock be placed in a position where they will not be subject to the drainage from the adult lines.

EGG ROOM, INCUBATOR, FEED ROOM.— Where the egg-packing room and storage room is combined with the feed room and incubator room, the egg room is generally placed nearest the nests, to take full advantage of ventilation and shade. The incubator room is placed centrally and insulated, while the position of the feed room is only governed by the ease of unloading, processing and storing feed.

Artificial incubation can be carried out by small unit machines or machines of the mammoth type, but in general the largest types are operated by experienced persons in hatcheries. If eggs are to be artificially incubated they should be set within 7-8 days of their having been laid, and should be protected from draughts. The best method of doing this is to provide an egg cabinet in the incubator room. It is a distinct advantage to have the windows fitted with shutters or blinds, in order that the room may be blacked out for the testing of the eggs.

The egg room is fitted with grading table or balance, packing boxes, collection buckets, tables, racks, etc., according to the individual requirements of the owner. Large quantities of grain are best stored in outside batteries of silos, but for special items such as mash mix, shell grit, etc., accommodation is made in the feed room. In addition, machinery is installed to treat or mix the various feed components. These include:

Grist Mill.
Green Feed Cutter.
Mash Mixer.

BROODERS.— Artificial brooding can be carried out in a variety of forms, varying from small units of electrical or kerosene types to the larger types. The shed itself is divided in subdivisions or brooder units, in which electrically operated battery brooders are installed.

WEANING PENS.— Weaning pens are designed to meet the requirements for chickens from 6-12 weeks of age. Ramps are provided with flat roosting accommodation, and for the first few nights the chickens are drafted up the ramps.

COLONY HOUSES.— The most satisfactory system of rearing stock from about three months of age onwards is on the "Colony System," this being for all practical purposes a "free range" proposition. Young stock are liable to crowd together on the perches, and when large numbers are placed in a house they swelter on hot nights and injury results.

Portable houses have been tried, but in most cases are impracticable because of the difficulty of arranging the water supply. If it is desired to use portable types, then the best plan is to provide one 400-gallon C.G.I. tank with each shed. These, with the necessary ball cock fittings and troughs, should be sufficient, with normal rainfall, for all but the driest areas.

In using colony houses, it is essential to keep the birds in a small temporary enclosure around the house for at least a week after they are first put in, otherwise they will stray from one house to another, which results in overcrowding in some houses.

Labour costs are reduced by installing self-feeders for grain, dry mash, and shell grit, one of each type being used per house.

HOUSING OF LAYERS.— The housing accommodation for the laying stock is the determining factor of the carrying capacity of the farm. It is a mistake to construct small houses in the centre of the yard, a system which entails a good deal of labour to the sheds, more gates to be opened, and more ground to be traversed. The best position for the house is backing on to a lane or passage through the farm. For all practical purposes the housing of layers may be classified into:—

1. Intensive System, long narrow houses with partitions.
2. Semi-Intensive Systems.
3. Single Unit Houses, holding 50-100 birds, for roosting and laying only.

The semi-intensive system for housing layers is generally regarded as the best, though the most costly. It enables the layers to be allowed out during the day in favourable weather and confined to the shed during the cold winter afternoons and bleak days.

Under the intensive system the birds are kept confined in the houses at all times, and on this account only half the number of birds can be accommodated in a house of equal size compared with the semi-intensive system.

Where large areas of land are available the semi-intensive method of housing is used, but where the area of ground is restricted to the extent that only small runs can be allowed for both young stock and layers, it might be better to adopt the intensive system for the laying stock, and give the young stock the benefit of what ground is available. There is little objection, however, to the use of the intensive system when the laying accommodation for the first year birds in semi-intensive and for the second year birds intensive.

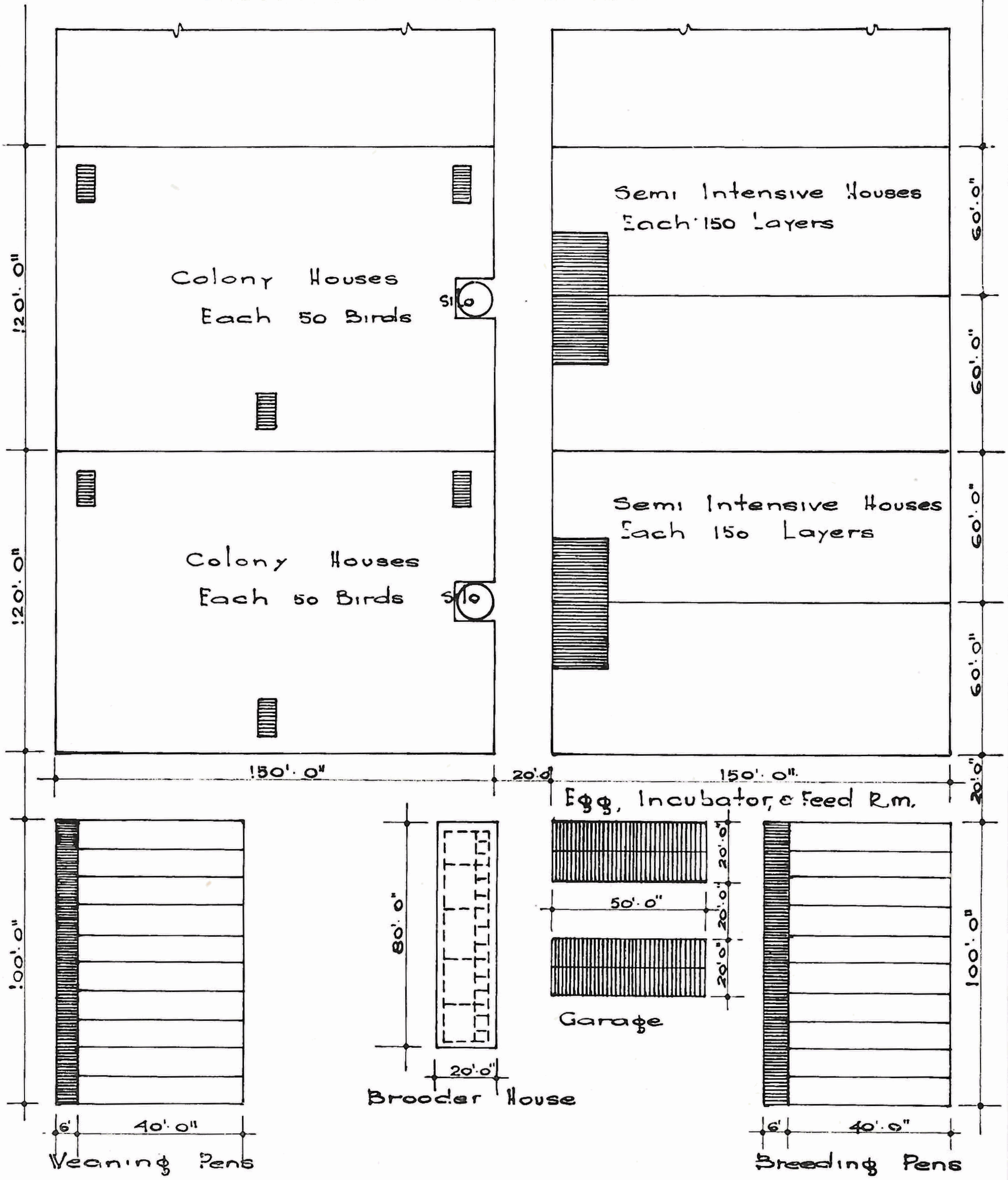
GREEN FEED.— Green feed crops are a valuable asset as a regular supply of succulent feed. An abundance of green feed is not only of value in maintaining the health of the birds, but is an economic measure in relation to the feed account. Consequently, an area must be set aside for growing green feed crops, and a watering system installed so that the green growth is maintained the whole year around.

SILOS.— Grain feed is best held in tank-type silos, located adjacent to the laying and colony houses.

NOTE.— This Sheet should be read in conjunction with Sheet 4612B.

LYSAGHT'S
COUNTRY SERVICE

GROUND PLAN LAYOUT OF POULTRY FARM



POULTRY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4612B

GROUND PLAN LAYOUT OF POULTRY FARM

GENERAL.—The housing accommodation for the laying stock is *the determining factor in the carrying capacity of the* farm, and the plan shown overleaf is applicable to a small farm of 1,00-2,000 layers. Whereas 1,000 layers can be established in an area of about 3½ acres, it is not wise to restrict future operations to the initial one-man show. Bearing in mind the future employment of labour and extensions, 5-6 acres is a minimum area upon which to establish a farm with the object of making a living.

It is advisable to select land where there is a permanent supply of piped water available. This can be from a town supply or from a local supply by arranging a suitably placed 20,000-gallon corrugated galvanized sheet tank with the necessary pipe reticulation. To provide for both drinking purposes and growing feed for 1,000 layers, approximately 50,000 gallons of water per year are *required.*

PLANNING.—No matter whether it is only intended to start in a small way, or with the object of creating an initially large farm, a definite layout and plan of operations must be prepared before erecting a single poultry house. *In laying down a plan, provision should be made* for extensions for each section of the farm, so that additions may be made to the different stages of accommodation in time, on the area set apart for each.

The Semi-Intensive Housing accommodation is arranged to provide for 150 layers to each unit. The balance of the farm equipment is designed to maintain the layers by replacing half the number of hens per year. For example, in a farm of 1,000 layers, colony houses are arranged to raise 500-600 pullets (allowing for losses over and above the normal two years' use of stock). The ultimate number of structures will depend upon the nature of the farm. An incubator is not essential, for whereas some owners may prefer to instal their own incubators, a large number buy day-old chickens, three-weeks-old chickens, or purchase four to five-weeks old pullets from hatcheries *specialising in young stock.*

BROODERS.—Artificial brooding can be carried out in a variety of forms, the chief of which, from a building point of view, are:—

1. Multi-tray or battery electrically heated brooders of the "Multiplo" type, which are used by hatcheries. Such a battery—five trays high, each tray of 150—holds 750 chickens. Four or five of these are placed in a shed to raise 3,000-5,000 chickens. Chickens in this type are only kept in the brooders for a few weeks and then transferred to "cold" brooders.
2. The sub-divided brooder house type, with inside runs, as illustrated in Sheet 4632.
3. The sub-divided brooder house with outside runs. This type is generally adopted where space is not limited.

No matter what the type of brooder system, the house should be entirely enclosed (less doors and windows). Open-fronted sheds are altogether unsuitable for any system of breeding chickens or, in fact, the housing of chickens of any age up to 10 weeks.

Brooder houses with inside runs are generally about 20' wide, while battery houses and houses with outside runs are 14'-15' wide. Brooder houses with inside or outside runs are generally built in multiples of 8' wide runs. Each such run is fitted with two heated compartments (the basic brooder unit), each compartment having a capacity of 100 day-old chickens. These are thinned down to 50 per compartment before leaving the brooder, i.e., 100 per run. A shed 80'-90' long is suitable for 1,000 chickens.

Sunlight and ventilation are controlled by the use of fanlights and blinds.

WEANING PENS.—It is advisable to construct weaning pens limited to 60-75 chickens. A suitable structure is 10' long, 6' deep, 6' high at the front, and 5' high at the rear. These are built in a long line, limited to 100' in length, each unit being provided with an enclosed run 10' wide and 40' long.

COLONY HOUSES.—While birds may be housed in numbers of 100 in the cool weather, autumn, and cold parts of *Australia, it is preferable to run them in batches of 50-*65. Young stock can be housed in 50's in suitable 12' x 6' houses, 6' high at the front and 5' high at the rear.

These should be placed in large enclosures with no more than three or four houses per run. Eight of these houses can be used per acre. A suitable arrangement is two houses per quarter-acre paddock, or three houses per enclosure of the size illustrated in the plan. It will be noted that these three colony houses for pullets replenish the layers for two semi-intensive laying houses. Movable frames are used to form a small enclosure around the house for six days until the birds are accustomed to their locality. The frames are then removed, and can be used again. Three frames, with the house acting as one side, form a collapsible yard. Side frames are of four vertical posts, top and bottom rails, and *are 18' long x 6' 4" high.* End frames of three vertical posts are 12' long x 6' 4" high, and have top and bottom rails. A small gate 24" wide is let into one side frame for convenience in attending to the birds. All frames are constructed of 3" x 1" battens, covered with 72" x 2" mesh x 18g. galvanized wire netting.

HOUSING OF LAYERS.—The housing of layers may be classified into:—

1. The Intensive System—100-bird compartments.
2. The Semi-Intensive System—150-bird houses.
3. Single Unit Houses, roosting and laying only—50-100.

Semi-Intensive houses should have a floor space of at least 2 sq. ft. per bird. 150 birds can be accommodated in a shed 22' x 16', 8' 6" high at the front and 6' 6" high at the rear. The width of any house should not be less than 15', and the length is generally 20'-30'. There is no objection to building double houses with a solid division down the centre, as illustrated in the layout. It is not satisfactory to have a long lane of these houses with narrow runs. Where double houses only are built, the runs can still be extended to any width desired.

For Intensive houses, allow 4 sq. ft. per bird, a common type of construction being that illustrated in Sheet 4663. A long shed is divided into a series of compartments 20' long, 16' wide, to hold 80-100 birds.

Perches are to be 3" wide hardwood battens, placed 20"-24" apart. The perch nearest the wall should be a minimum of 15" from the wall, and all perches 20"-24" from the floor. Perches can be used as coming from the mill, and whereas there is no objection to chamfering the raw edges, perches should not be rounded or planed to make them smooth. Up to 8' span 3" x 1" battens are used, and over this span 3" x 2". In calculating the length of perch required, allow 1' per bird.

A suitable size for nest compartments is 13" x 10" x 7" deep.

Feed can be held *in self-feeders, prefabricated troughs,* or troughs made from 5" quadrant guttering.

BREEDING PENS.—A suitable type of breeding pen is illustrated in Sheet 4672. Each unit is 10' wide and 46' in length. Each run includes a shed 10' wide x 6' deep, the height at the front being 6', the rear 5'. *Each pen is divided* into two parts, one half for scratching and laying, the other half for roosting.

FENCES.—Fences are constructed of 8' lengths of 3" x 2" hardwood, sunk 18" in the ground, and covered with 72" x 2" x 18g. galvanized wire netting. Corner posts are braced diagonally with 3" x 2" members.

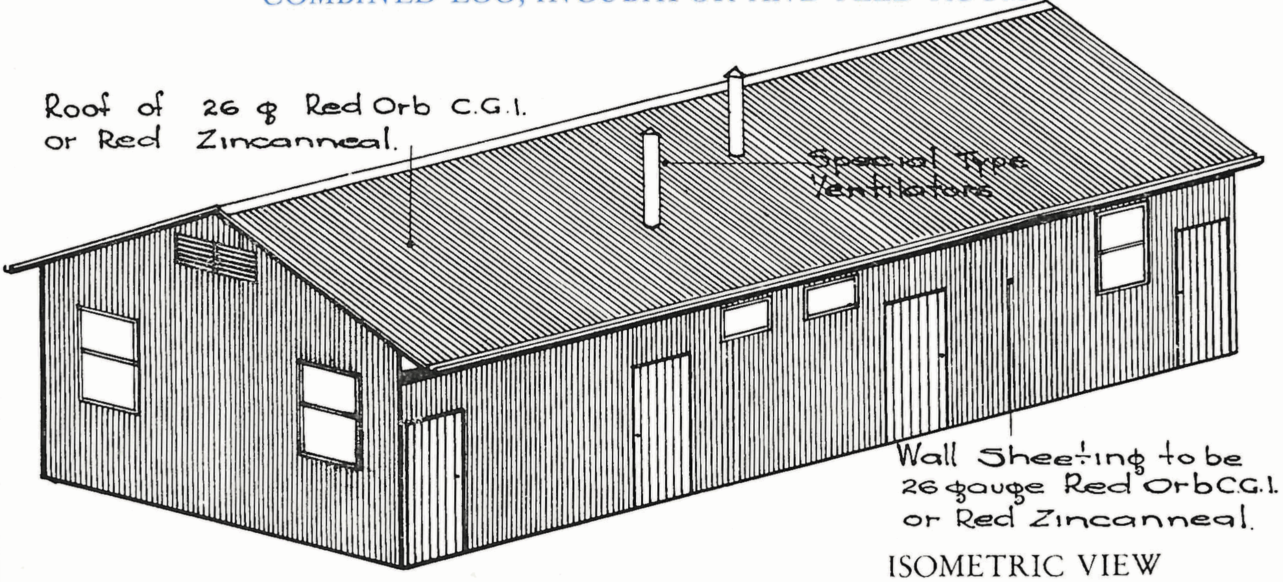
SILOS.—Tank type silos are installed to hold grain feed. These are best situated adjacent to laying and colony houses.

POULTRY SECTION

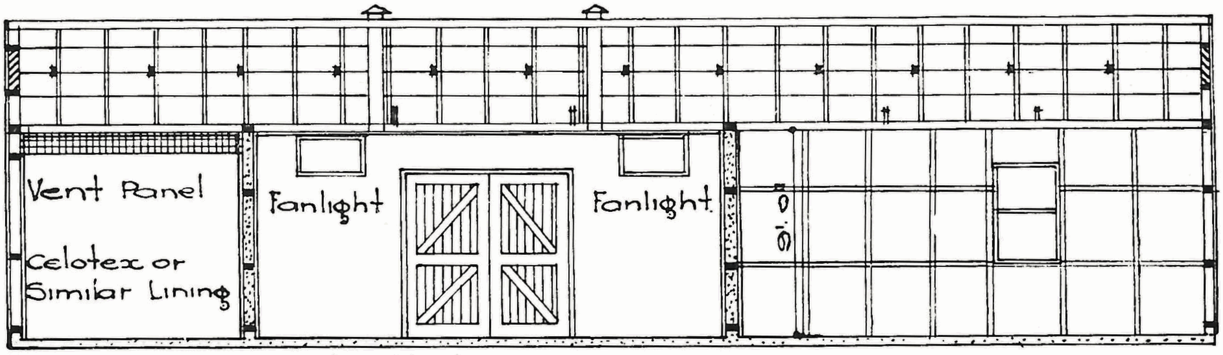
LYSAGHT'S
COUNTRY SERVICE

SHEET 4622

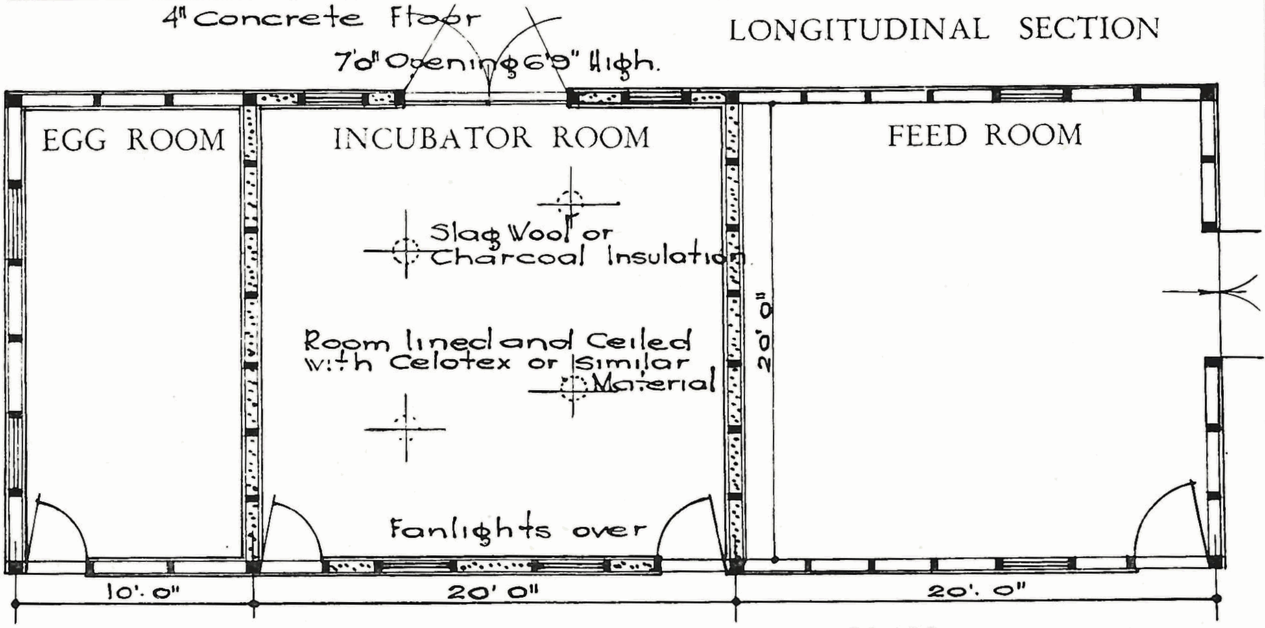
COMBINED EGG, INCUBATOR AND FEED ROOM


Roof of 26 g Red Orb C.G.I. or Red Zincanneal.
Special Type Ventilators
Wall Sheeting to be 26 gauge Red Orb C.G.I. or Red Zincanneal.

ISOMETRIC VIEW



LONGITUDINAL SECTION



PLAN

POULTRY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4622

COMBINED EGG, INCUBATOR AND FEED ROOM

GENERAL.— Where the poultry farmer has his own incubator room, a suitable structure is that described overleaf, in which a long shed is partitioned off into egg room, incubator, and feed room. The partitioning into various sizes can be carried out according to individual taste.

FLOOR.— The floor of the building should be of 5:2½:1 concrete mix, 3" thick, graded to fall toward the exits. Provide a 4" high dwarf wall under the bottom plates of all wall framing and internal partitions. In this dwarf wall set ⅜" diameter rag bolts, to which wall plates are secured.

WALL FRAMING.— The walls are framed up in:—

4" x 4" Corner Main Partition Studs, and studs for double doors.
4" x 2" Intermediate Studs, centres not exceeding 3'.
4" x 2" Top and Bottom Plates.
4" x 2" Noggings, placed conveniently for fixing of internal linings and ventilating panel.

Gable framing and internal partitioning is framed up in 4" x 2" vertical members and noggings.

ROOF FRAMING.— The roof is to be framed up with 4" x 2" rafters at 2' centres, 4" x 3" purlins, 8" x 1½" ridge piece, and 4" x 2" struts. Roof sheeting is fixed to 3" x 1¼" battens. Over egg room and incubator room 4" x 2" ceiling joists at 2' centres are to be fixed to 8" x 1½" hangers, spaced at not more than 8' apart.

ROOFING.— The roofing is to be sheeted with 12' lengths of Lysaght's 26g. 10-3" corrugations Red Orb or Red Zincanneal sheet, applied with a side lap of 1½ corrugations. Sheets are fixed with spring-headed roofing nails through the top of every second corrugation at end of sheets, and through the top of every fourth corrugation at intermediate battens.

WALL SHEETING.— The walls are to be sheeted with 9' lengths of 26g. 10-3" corrugations Red Orb or Red Zincanneal sheets, applied with a side lap of 1½ corrugations and an end lap of 4". Sheets are cut for gables as required.

RIDGE CAPPING.— The ridge capping is to be of 18" standard type 24g. Queen's Head or Zincanneal sheet in 6' or 8' lengths. Ridging is to be lapped 6" at the joints and securely fixed in position in conjunction with roofing sheets, with spring-headed roofing nails or galvanized screws and washers.

EAVES GUTTERS.— Eaves gutters to be 5" 24g. Queen's Head galvanized iron or Zincanneal beaded-edge quadrant type, in 6'-8' lengths, fixed in position with required falls to end desired. These are lapped 1½", double riveted, soldered at joints, and secured to rafters with 16g. galvanized brackets.

VENTILATORS AND FLASHINGS.— Provide four rain-proof cowls for 3" downpipe ventilators of the incubator room. Downpipes are fixed to the necessary ceiling apperture and fly-proofed with galvanized fly wire. Flash downpipe cowls and roofing sheet with lead flashing.

DOWNPIPES.— Provide and fix, where required, 24g. 3" diameter round galvanized iron or Zincanneal rain-water pipes, 6'-8' lengths, to carry water away to corrugated galvanized iron tank storage.

Note.—Rain-proof cowls and piping are only necessary with certain types of incubators. When using electrically heated incubators these can be dispensed with and a controllable ceiling aperture panel used.

Provide 12" deep ventilating panel below top plate level in egg room.

LINING.— Walls and ceilings of the incubator, and egg room, are to be lined with a suitable wall board. Apertures are to be provided for ventilating cowls in the incubator room, and a box aperture provided in the egg room. Line feed room with Red Orb galvanized sheet to hold insulation in place.

DOORS.— Provide one pair of double doors to the feed room and to incubator room, framed up in 5" x 2" styles and ledges, braced with 4" x 2" timbers, sheeted with 7' lengths of 8-3" corrugations Red Orb, and hung from 3" heavy T. hinges.

Provide single doors, one to the egg room, two to the incubator room, and one to the feed room. Doors are to be 6' 8" x 2' 8", framed up in 4" x 2" hardwood styles and ledges, braced with 4" x 1" timbers and sheeted with 4" x 1" timber. Hang each door with three 6" heavy T. hinges. Where large mammoth incubators are installed, one set of double doors may have to be provided in the incubator room in lieu of two single doors. Particular note should be made of the dimensions of the type of heater to be installed.

WINDOWS.— Provide windows to dimensions as required:

LIST OF QUANTITIES

TIMBER (linear feet):

4" x 4"	Studs	108
4" x 3"	Purlins	105
4" x 2"	Studs	414
	Bottom Plates	160
	Top Plates	185
	Noggings (sides, gables, partitions)	390
	Rafters	700
	Collar Ties	90
	Struts	50
	Miscellaneous	50
	Ceiling Joists	270
3" x 1¼"	Battens for roofing	430
6" x 1"	Ridge Board, fascia	210
8" x 1½"	Hangers	80

LINING:

Proprietary line wall board	sq. ft. 1750

INSULATION:

(Of an approved type)	cu. ft. 220

WINDOWS:

Sash	No. 4
Fanlight	No. 4

DOORS:

Single	6' 8" x 2' 8"— 4
Double	6' 8" x 7' 0"— 2

PLUMBER:

Red Orb or Red Z.A. 26g. 10-3" corrugations—	
Roofing, 12' sheets	46
Walling, 9' sheets	51
Feed room lining, 9' sheets	8
Queen's Head 6' x 36" x 26g. flashing	1
Ridging, 18" standard Queen's Head, 8' lengths	7
Guttering, 5" quad. Queen's Head, 8' lengths	14
Downpipe, 3" round Queen's Head, 8' lengths	4
" for ventilation, 6' lengths	4
Bolts, galvanized nails, brackets, solder as required.	
Birdwire	12" wide strip, ft.—24

CONCRETOR:

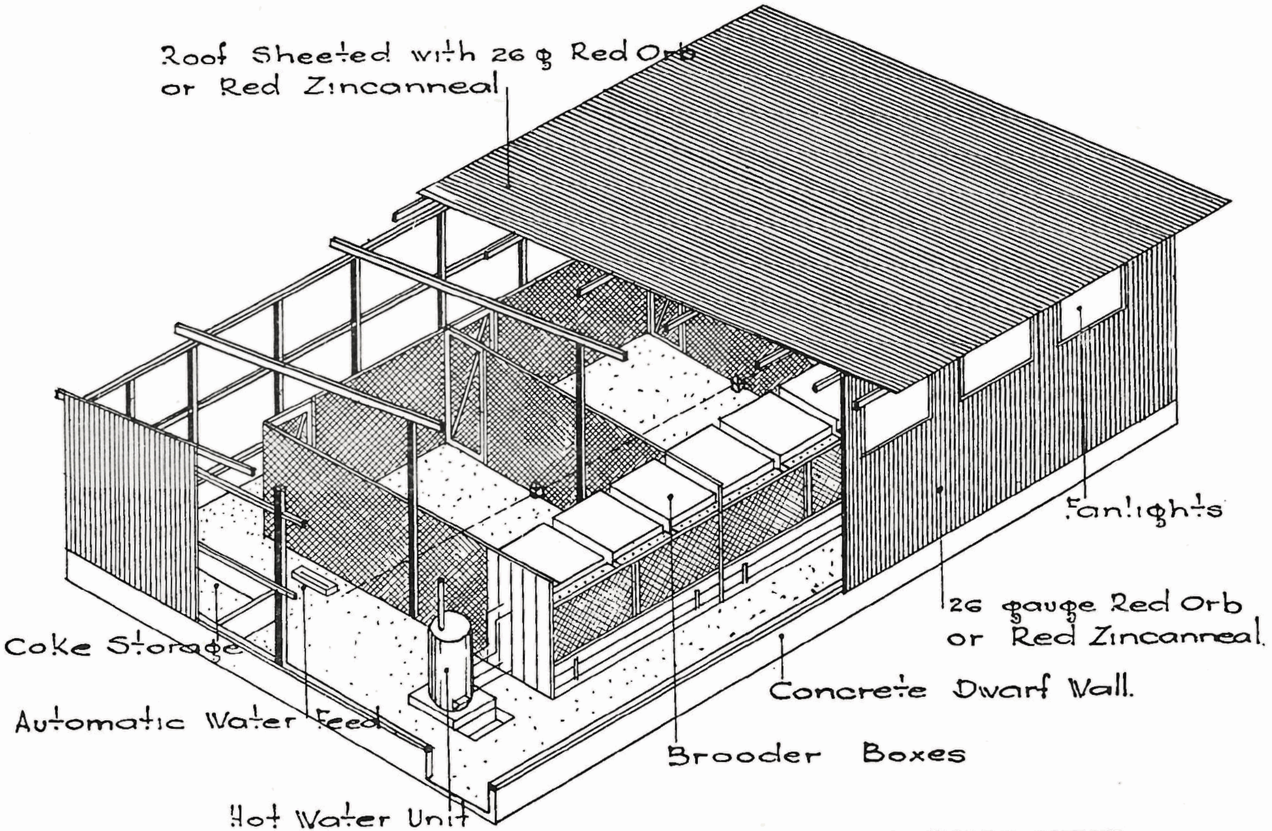
Concrete (5:2½:1)	cu. yds.—11
Cement	bags—53
Sand	cu. yds.— 5
Aggregate	cu. yds.—10

POULTRY SECTION

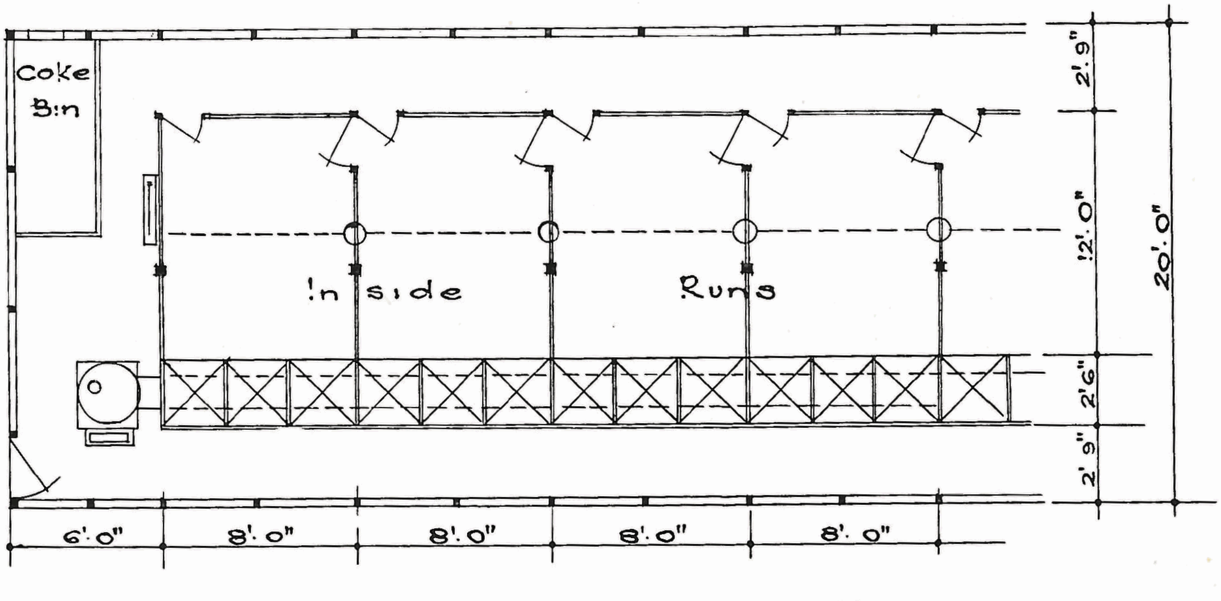
LYSAGHT'S COUNTRY SERVICE

SHEET 4632

BROODER HOUSE



ISOMETRIC VIEW



PLAN

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POULTRY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4632

BROODER HOUSE

GENERAL.— Many types of brooders are in use on poultry farms, but for the average commercial farm, running 600 layers or over, the most suitable type of brooding is the hot water circulating system housed in a skillion type roof structure, as is illustrated overleaf. This is of the intensive type, where the chickens complete the whole of their brooding period without the use of external runs.

The floor area is divided into 8' wide pens, each being 12' long and designed to run 100 chickens. To each pen is a collection of top and bottom boxes heated by upper and lower rows of pipes respectively. To each 8' pen are two 4' x 2' bottom boxes, framed up in battens and 1" fencing wire, these holding chickens during most of the brooding period. To each 8' wide run are three 2' 6" x 2' top boxes, to hold the chickens for a few days after they come from the hatcheries or incubators.

The shed should not be less than 16' wide, 7' high at the back and 9' in the front, but it is a distinct advantage to have a shed wider, allowing for a passage-way all around the shed. Our recommendation of a 20'-wide shed allows a minimum passage-way of 2' 9". The length will, of course, depend upon the number of brooder units.

FLOOR.— The most satisfactory floor is a concrete one, as it can easily be kept clean and in a hygienic condition. The foundation should be levelled so as to ensure an even thickness of concrete throughout. The surface should then be thoroughly wetted and a mixture of 1 part cement, 3 parts sand, and 5 parts metal screenings (5:2½:1 concrete) laid to a minimum depth of 2". The surface is rendered to approximately ⅜" deep with 1 part cement to 2 parts sand. It is advisable to complete the rendering on the day that the underneath concrete is placed. The floor should be poured section by section, with expansion joints about 8' apart, corresponding to the spacing of the pens. This lessens the tendency to crack.

DWARF WALLS.— Wall framing is to be fixed on a concrete dwarf wall 3" thick and 12" above floor level, constructed of 5:3:1 concrete. ⅜" diameter holding down bolts are used to secure wall plates to the concrete dwarf walls, and set to a depth of not less than 3".

WALLS.— The walls are framed up in:—

3" x 3"	Corner and Door Posts.
3" x 2"	Intermediate Studs.
3" x 2"	Top and Bottom Plates.
3" x 1½"	Girts (or battens).
3" x 2"	Timbers for window frames.

ROOF FRAMING.—The roof framing is supported on the wall plates and intermediate 3" x 3" posts set in concrete at mid points in the span of the building. The roof is framed up in 4" x 2" rafters at 3' centres and 3" x 2" battens. The space between wall plates and rafters should be closed with 4" x 1" boarding.

WINDOWS.— Provision should be made for windows, both back and front, not more than 8' apart. These should be of fanlight swing type, a suitable size being 3' x 2' 3", pivoted at the middle of the framing so that the length of the window runs the same way as the length of the building. They should be placed as high as possible in the 7' wall.

DOORS.— A door should be provided at each end of the structure. This is of the simple framed, ledged and braced type, sheeted with 4" x 1" T. and G. timbers.

ROOF SHEETING.— The roof is sheeted with 12' lengths of 10-3" corrugations Red Orb or Red Zincanneal sheet, side lapped 1½ corrugations and end lapped a minimum of 6". Fix in position with spring-headed roofing nails through the crest of every second corrugation at end fixings and every fourth corrugation at intermediate points.

WALL SHEETING.— The walls are sheeted with 6' and 7' lengths of 10-3" corrugations Red Orb or Red Zincanneal sheet, cut as desired to fit around fanlights, side-lapped one corrugation and fixed in position with roofing nails through the top of every second corrugation at ends, and through every fourth corrugation at intermediate points.

BROODER BOXES.— Lower brooder boxes are framed up in 3" x 1" battens, 6" x 1" boards, 1" wire mesh, to the pattern desired by the owner, approximate size 4' x 2', with hinged rear lid. Upper boxes approximately 2' 6" x 2' wide are the standard prefabricated types manufactured in Queen's Head galvanized iron.

INSIDE RUNS.— The inside runs are framed up in 3" x 1" timbers with 72" x 1½" x 18g. wire netting. A framed and braced door is provided to each 8'-wide pen opening out on to the passageway, the door being swung some 12" above ground level (the lower 12" is boarded up).

HEATING SYSTEM.— The success of hot water circulating systems of heating chicken brooders has been amply demonstrated, and any suitable make slow combustion boiler will function with the design illustrated. By suitably arranging the expansion pipe and circulatory top and bottom pipes, correct circulation can be arranged without pipes having a gradient.

COKE BIN.— It is a distinct advantage to have a small coke bin 8' x 4' wide in one corner of the building, filled by a trapdoor let into the side of the building.

AUTOMATIC WATER.— The automatic drinking water system gives most satisfactory results, and, as illustrated, consists of a master trough of galvanized iron with ball valve, connected to a length of pipe running to watering units, each unit servicing two pens. Each pen-watering unit is covered with a shield, round holes being let into the side of the shield so that the chickens can water without drowning.

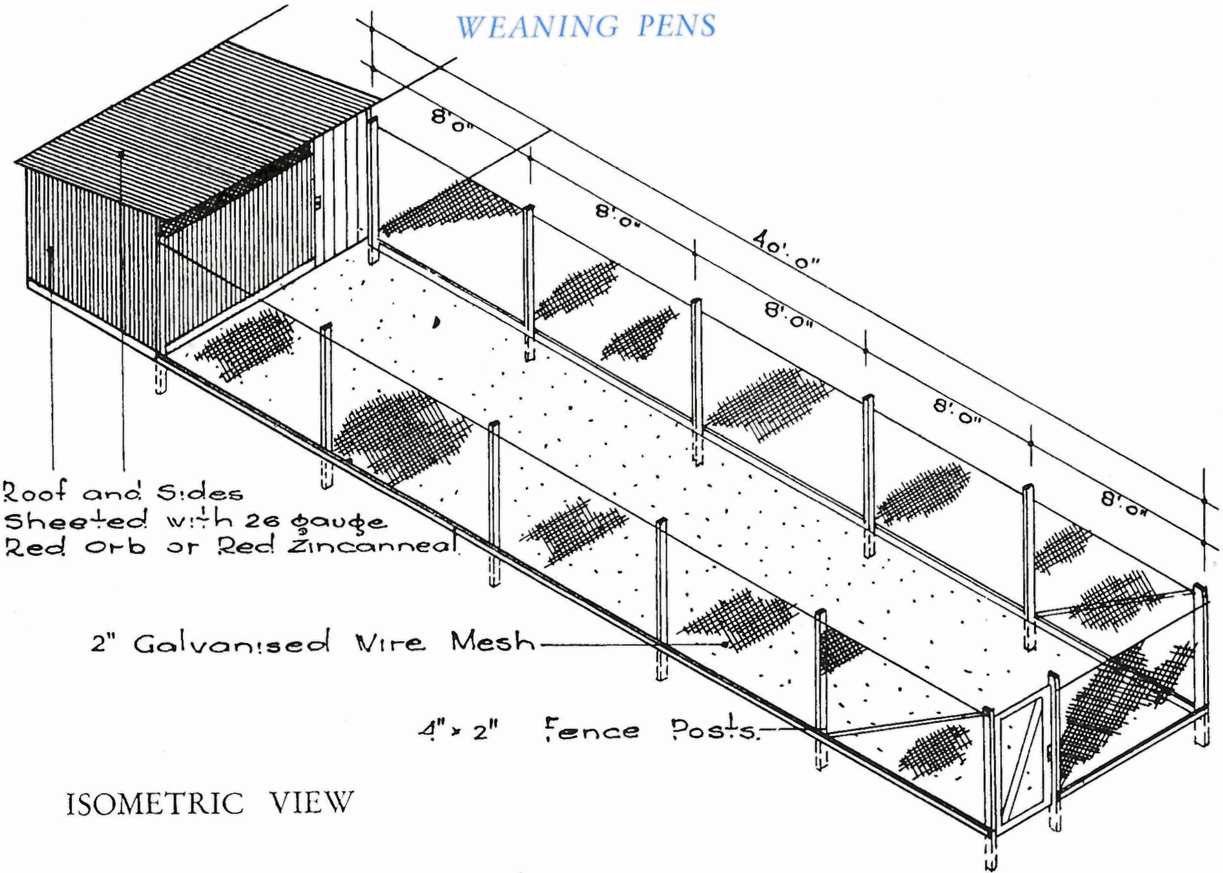
LYSAGHT
ORB
AUSTRALIA

POULTRY SECTION

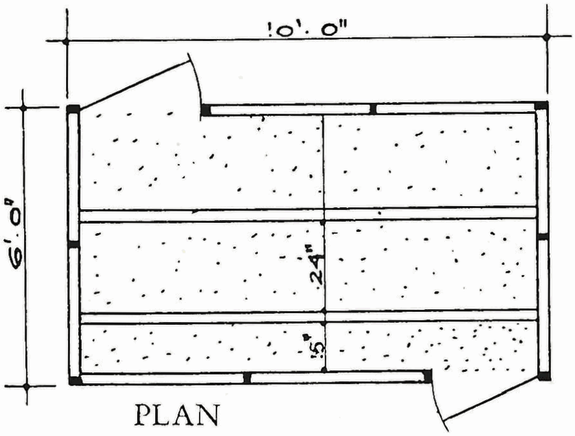
LYSAGHT'S
COUNTRY SERVICE

SHEET 4642

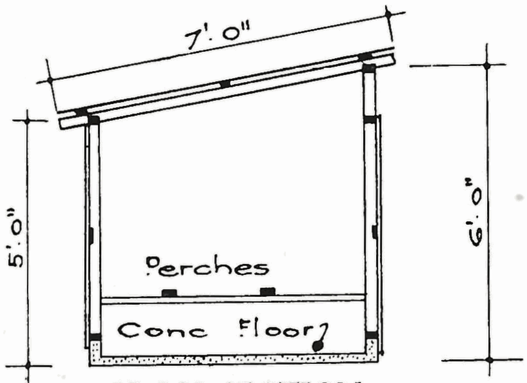
WEANING PENS



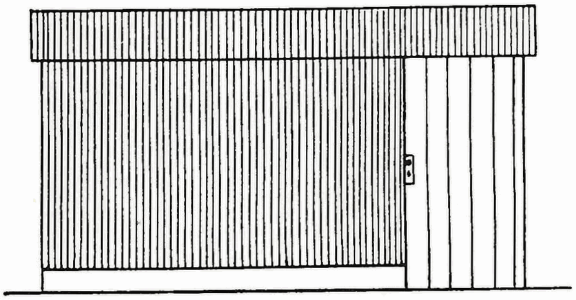
ISOMETRIC VIEW



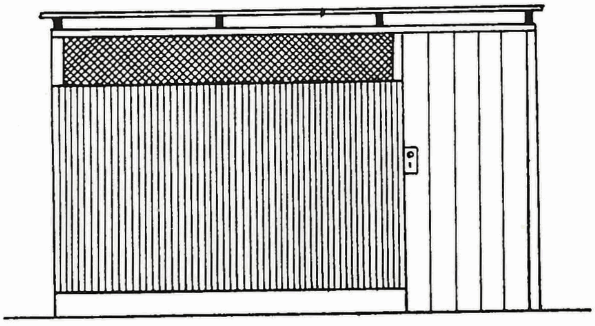
PLAN



CROSS SECTION



REAR ELEVATION



FRONT ELEVATION

POULTRY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4642

WEANING PENS

GENERAL.—Weaning pens are designed to meet the requirements for chickens from 6-12 weeks of age. The most suitable type of house in which to teach chickens to roost is one enclosed on all sides except for an opening of about 12" along the front, and an aperture of 3" at the back for light and air. It is advisable to construct small pens, such as illustrated, to accommodate 60-75 chickens, rather than use larger houses. A suitable size for 75 chickens is 10' long x 6' wide, with a height of 6' in front and 5' at the rear. Such houses can be joined together in a long line, each provided with a run 40' long by 10' wide. The ground and the run should slope away from the building. Apart from the internal fittings and door arrangements, the main structure of the weaning or rearing pens is identical with that of the breeding pens. If this is realised, and arranged, then the cutting of timber, etc., for the poultry farm lay-out is simplified.

FLOORS AND DWARF WALL.—Floors are formed of 2" depth of concrete, cement rendered, mix of 5 parts metal, 3 parts sand, and 1 part cement. Wall framing is to be fixed on a concrete dwarf wall 3" thick and 4" above floor level. $\frac{3}{8}$" diameter bolts should be set in concrete to a depth of not less than 3". These are to hold wall plates.

FRAMEWORK.—The shed is framed up in:—

3" x 2" Bottom and top plates.
3" x 2" Studs and rafters.
3" x 1" Battens for carrying roof sheeting.
3" x 1" Girts for carrying wall sheeting.

Girts are provided two to the front of the pen, and one to each wall on the other three sides.

ROOF SHEETING.—The roof is sheeted with 7' lengths of 26g. 10-3" corrugations Red Orb or Red Zincanneal Sheet, lapped one corrugation. Sheets are fixed to the battens with spring-headed roofing nails pierced through the top of every second corrugation at ends of sheets and through every fourth corrugation at the intermediate battens.

WALL SHEETING.—The walls are sheeted with 26g. 10-3" corrugations Red Orb or Red Zincanneal sheet, lapped one corrugation. Sheets are fixed to the girts or plates with spring-headed roofing nails through the top of every second corrugation at ends of sheets, and through every fourth corrugation at intermediate girts.

5' sheets are used at front and rear of shed.

6' sheets are used at the sides, trimmed to the required size.

PERCHES.—Hardwood batten platforms and roosts are arranged in the shed according to the age of the chickens.

To teach the chickens to roost a batten frame covered on the underside with 1" mesh wire netting is placed across the end of the house farthest from the door. The frame is constructed of 2" x 1" battens, placed 4" apart, with 1" mesh wire netting nailed to each batten to prevent sagging. A suitable width is 2' 8", and a frame may be placed about 6"-8" above the floor of the house, with a board along the front to prevent the chickens getting underneath.

It is advisable to have a canopy of sacking to place about 15" above the frame for use in cold weather. This should not completely cover the length of the frame, as it is necessary to allow sufficient space for fresh air. The bag covering should only be required during the first week, after which the main perches could be placed in position.

Two main 3" x 1" perches are finally installed, running the length of the compartment and about 15" above the floor. The rear perch should be 15" out from the wall, and the distance between the first and second should be 24". When this is complete the final perches are installed. These consist of 3" x 1" perches loosely fixed to battens, some 15" above floor level. The rear perch is 15" from the back of the shed, while 24" is allowed between the first and second.

DOORS.—A 2'-wide door the height of the wall is provided at the front of the shed, opening out into the run. This is framed, braced, and sheeted in 4" x 1" timber and swung with two 6" T. hinges, a suitable fixing for closing being provided. Though not essential, a similar door can be provided at the rear of the shed, as illustrated.

FENCE.—A 40' length of outside yard is provided to each pen. Corner and gate posts are 8' lengths of 4" x 2" hardwood.

All other posts are 8' lengths of 3" x 2" hardwood, placed 8' apart and sunk 20" in the ground, the wire netting being fixed to the 2" face. That portion sunk in the ground and 6" above ground level should be coated with creosote or any other ant-deterrent compound before placing.

3" x 1" hardwood battens are then nailed all around the bottom of the yard. To these 72" x $1\frac{1}{2}$" x 18g. or 19g. netting is tacked. This results in the full height of the wire netting above the level of the ground being used.

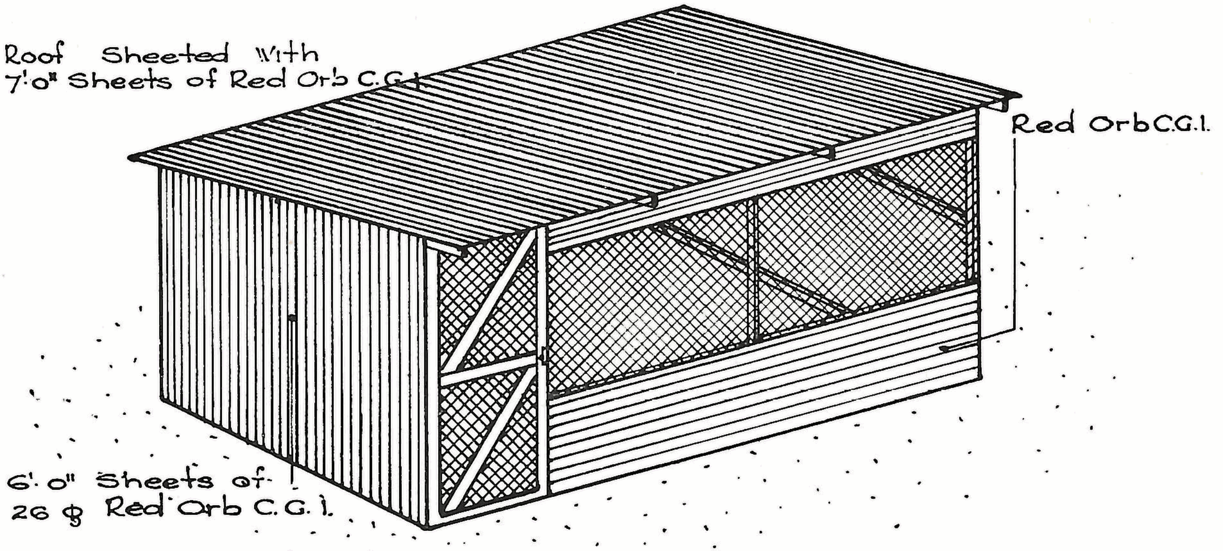
GATES.—The gates are constructed with 3" x 1" timber frames covered with 1" mesh wire netting. These are swung on 4" x 2" gate posts with 6" T. hinges.

YARD AUXILIARIES.—Automatic water feed troughs, etc., are provided as required.

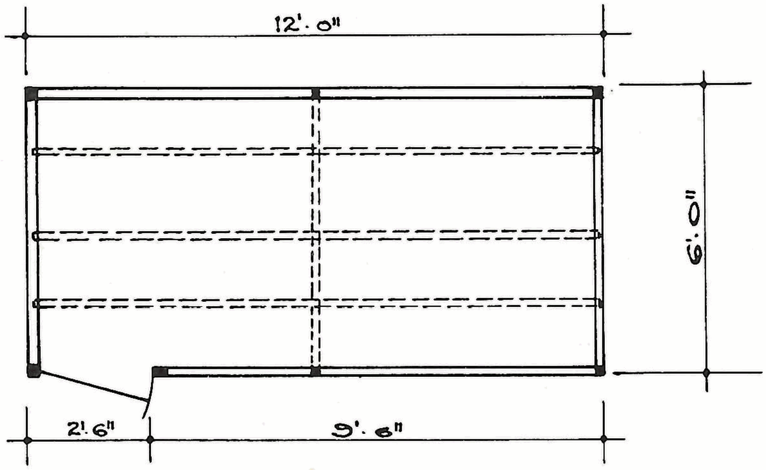
LIST OF QUANTITIES

Material	Per Single Pen	For each additional Pen	Total for 5-Pen unit
TIMBER:	Lin. ft.	Lin. ft.	Lin. ft.
4" x 2" Fence posts, 8' long ..	24	16	88
3" x 2" Bottom plates	26	20	106
Studs (5' 4" x 4' 4") ..	43	37	191
Top plates	20	20	100
Rafters, 4/7' per unit pen	28	21	112
Fence (8' long x 11' diagonal)	110	57	338
4" x 1" Door and temporary ramp	58	58	260
3" x 1" Battens, 3/10' 4"	31	31	155
Girts	24	18	96
Perches, 2/10' 4"	21	21	105
Fence	90	50	290
Gate	25	25	125
Miscellaneous	5	—	25
GALVANIZED IRON AND ZINCANNEAL SHEETS:			
26g. 10-3" Red Orb or Red Z.A.			
Roof, 7' sheets	4		21
Sides, 6' sheets	$2\frac{1}{2}$	$2\frac{1}{2}$	15
Front and rear, 5' sheets ..	7		—
NETTING:			
Fence, 72" x 2" mesh x 18g. ..	88	40	288 (2 rolls)
Gate and Panel, 30" x 1" mesh x 19g.	10	—	50
CONCRETE: 1/3 cubic yd. per unit.			
Metal, cubic yards	1/3	—	2
Sand, cubic yards	1/6	—	1
Cement, bags	2	—	10
Nails, hinges, strapping, as required.			

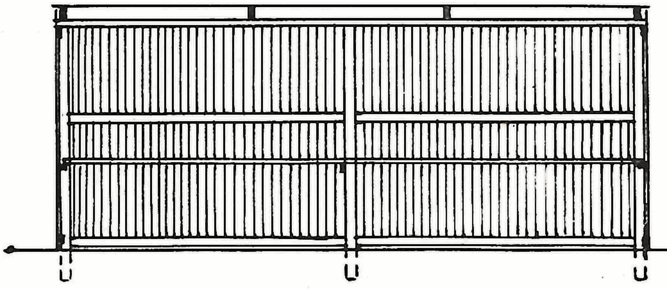
COLONY HOUSE



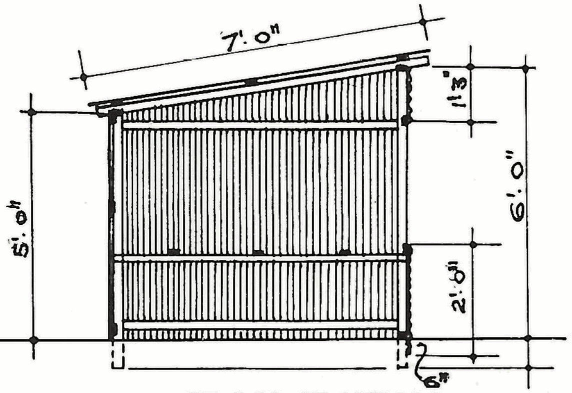
ISOMETRIC VIEW



PLAN



LONGITUDINAL SECTION



CROSS SECTION

POULTRY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4652

COLONY HOUSE

GENERAL.—The most satisfactory system of rearing young stock from about three months of age onwards is in the "Colony House," this being, for all practical purposes, a "free range" proposition.

Young stock are liable to crowd together on the perches, and if large numbers are placed in a house they swelter on hot nights and injury results. While birds may be housed in numbers of 100 in the cool weather or autumn, it is preferable to run them in batches of 50 or 75. Young stock can be housed in 50's in suitable 12' x 6' houses, which should be placed in large enclosures with no more than three or four houses per run. Eight of the above houses can be used per acre, a suitable arrangement being two houses per quarter acre paddock.

FLOORS.—In the Colony type of house the floors are formed of rammed earth, built up some 4"-6" above the level of the surrounding country. Some owners may prefer to use concrete, and if there is no objection to incurring additional expense, a 2"-3" concrete floor of 5:3:1 mix is a distinct advantage to the cleanliness and hygiene of the house.

FRAMEWORK.—The structure is framed up in:—

3" x 2" posts.
3" x 2" top plates.
3" x 2" rafters.
3" x 1" battens for fixing roofing and wall sheets.

ROOF SHEETING.—The roof is sheeted with 7' lengths of 26g. 10-3" corrugations Red Orb or Red Zincanneal sheet. Sheets are fixed to battens with spring-headed roofing nails, pierced through the top of every second corrugation at end fixings and every fourth corrugation at intermediate battens.

WALL SHEETING.—The walls are sheeted with 26g. 10-3" corrugations Red Orb or Red Zincanneal sheet, lapped one corrugation. Sheets are fixed to girts with spring-headed roofing nails through the top of every second corrugation at plates or top girts and through every fourth corrugation at intermediate girts.

5' sheets are used vertically at rear of sheds.
6' sheets are used vertically at the sides and trimmed to length.
5' sheets are cut in half longitudinally where required and laid horizontally on the front of the shed.

Sheeting laid longitudinally is lapped 4" and fixed at 6" centres along the sides. Sheets at ground level are painted and buried 3" in the ground.

PERCHES.—Perches are to be 3" x 2" hardwood battens, placed a minimum of 20" apart, 20" to 24" from the floor. The perch nearest the wall should be a minimum of 15" from that wall. Perches can be used as coming from the mill, and though there is no objection to chamfering the raw edges, perches are not to be rounded or planed to make them smooth.

DOOR.—A 2' 6"-wide door is provided at the entrance of the shed (wide enough to take a wheelbarrow). This is framed, ledged and braced in 3" x 1" timbers, covered with 1" mesh fencing wire, and hung with two 6" T. hinges, and provided with suitable fastening.

WIRE MESH.—Provide 2" mesh wire on the front of shed.

LIST OF QUANTITIES

TIMBER:

3" x 2"	Posts, 4/6' 6", 3/5' 6"	Linear ft.	43
	Plates, 2/12' 4"	" "	25
	Rafters, 4/7' 0"	" "	28
	Perches, 3/12' 4"	" "	37
3" x 1"	Battens, 3/12' 4"	" "	37
	Girts, 2/12' 4", 2/9' 8", 4/6' 6"	" "	70
	Doors, 2/5' 10", 3/2' 6", 2/3' 0"	" "	25

GALVANIZED IRON:

26g. Red Orb or Red Z.A., 10/3" corrugations:

Roof, 7'	5
Sides, 6'	6
Sides and front, 5'	9

WIRE:

36" x 1½" x 18g.	Linear ft.	16

Roofing nails, nails, and hinges, etc., as required.

LYSAGHT
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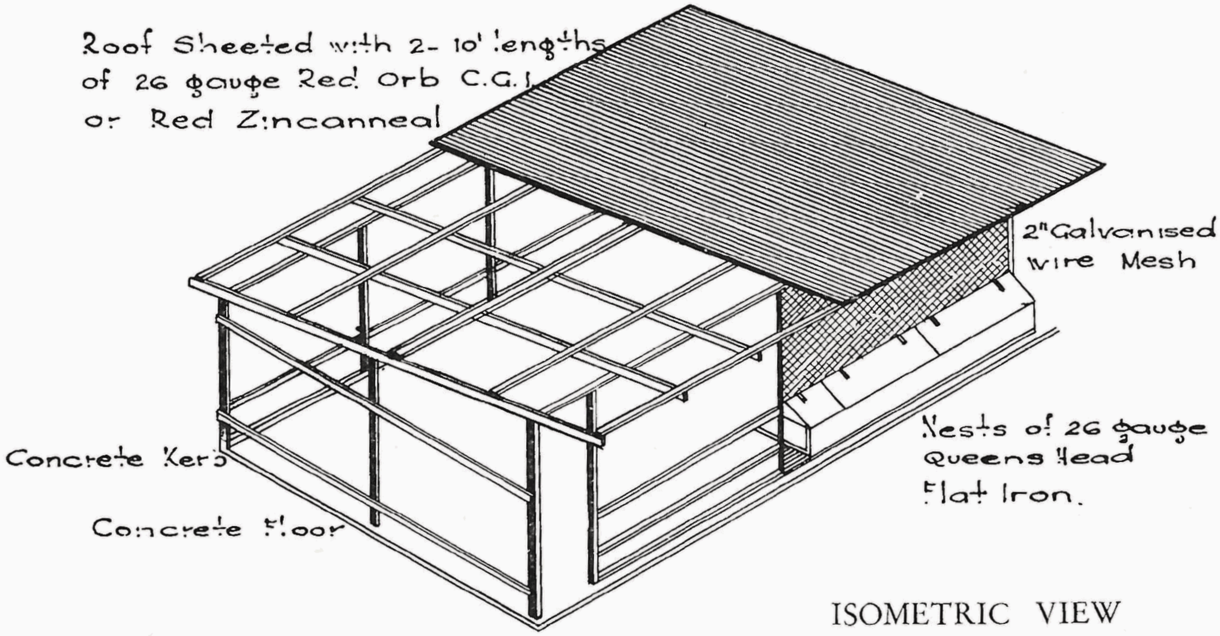
POULTRY SECTION

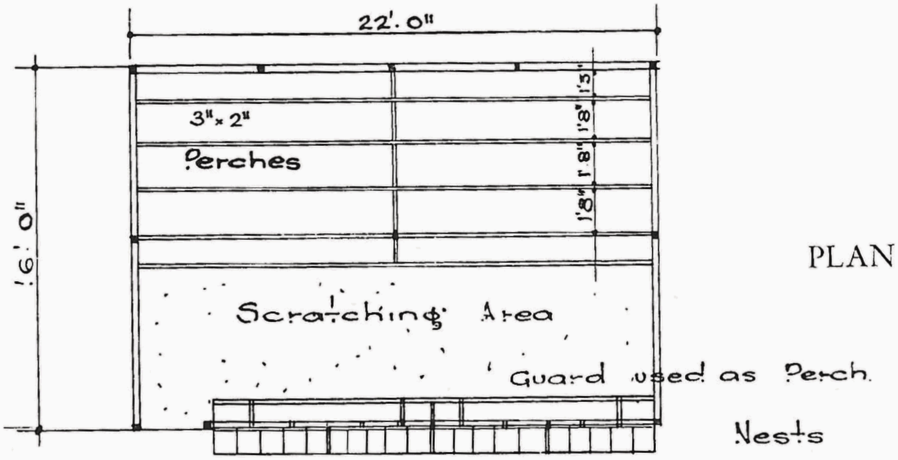
LYSAGHT'S
COUNTRY SERVICE

SHEET 4662

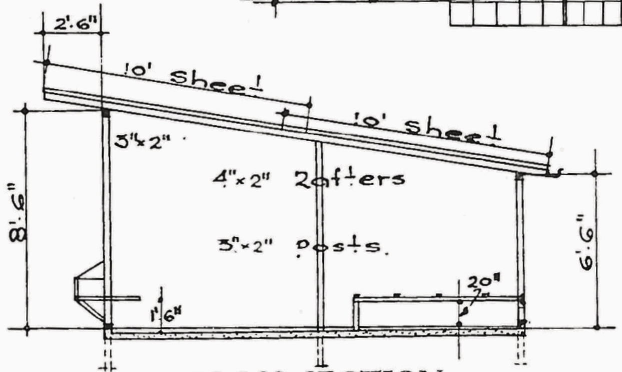
SEMI-INTENSIVE HOUSES — 150 LAYERS



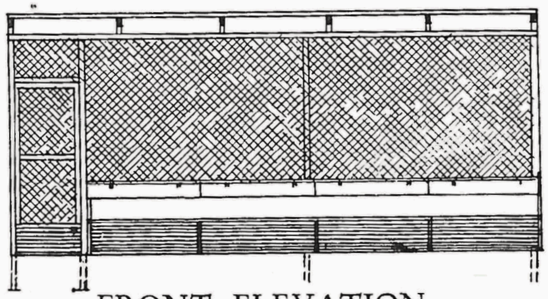
ISOMETRIC VIEW



PLAN



CROSS SECTION



FRONT ELEVATION

POULTRY SECTION

LYSAGHT'S
COUNTRY SERVICE

SHEET 4662

SEMI-INTENSIVE HOUSES — 150 LAYERS

GENERAL.—Under Australian climatic conditions the Semi-intensive system is ideal, as it enables the pullets to be allowed out during the day in favourable weather and to be confined to the shed during cold winter afternoons and bleak days.

A minimum width which is advisable is 15', with a length of 20' to 30', but it is an advantage to have the house a foot or so wider if possible. A minimum floor area of 2 sq. ft. per bird should be allowed. The accompanying plan shows a suitable house for the accommodation of 150 layers. The measurements are 22' x 16', 8' 6" height in the front and 6' 6" at the rear. The nests are built out at the front of the house and fitted with lids to enable the eggs to be collected from the outside. In addition, there is a closing device to prevent the birds roosting in the nests at night.

A dividing board about 12" high divides the shed into two areas, the back a roosting area, and the front for scratching litter.

FLOOR.—The floor should be of 5:3:1 mix concrete, graded to fall towards the front of the shed. This is poured after the shed is erected. Similarly, a 4"-high curb, 3" wide, surrounding the roosting area, is poured against the vertical wall sheeting. This curb prevents liquid from fowl droppings corroding the sheeting, in addition to facilitating cleaning.

POSTS.—Posts are to be of 3" x 2" timbers, sunk 18" in the ground. That portion set in the ground and 12" above ground level is to be coated with Creosote. Allowance is made in tamping earth around the posts for a space to be left to pour a concrete blob some 12" dia. 6" deep when pouring the floor. Tops of posts are halved to take 3" x 2" plates where necessary. 3" x 1" battens are checked in to take wall sheeting and wire mesh.

ROOF FRAMING.—The roof is framed up in:—

3" x 2" top plates.
4" x 2" rafters.
3" x $1\frac{1}{2}$" battens.

ROOF SHEETING.—Walls are sheeted with 10-3" corrugations Red Orb or Red Zincanneal sheet.

6' sheets at the rear of shed.
6' sheets to the size at the sides of the shed.
10' sheets laid horizontally at the front of the shed and buried 6" in the ground.

Sheets are fixed in position with spring-headed roofing nails through the crest of every second corrugation on end fixings and through every fourth corrugation on intermediate points. Sheets laid horizontally are fixed on horizontal battens at 6" centres along the sides.

GUTTERING.—Provide at the rear of the shed a 4" 24g. Queen's Head galvanized iron, beaded edge, quadrant type gutter. These are normally provided in 6'-8' lengths. Secure to rafters with 16g. galvanized brackets.

DOWNPIPE.—Provide 24g. 2" dia. Queen's Head galvanized sheet downpipe with the necessary bends and joints to carry the water away to a ground sump and drain.

PERCHES.—Perches are to be of 3" x 2" hardwood battens, placed a minimum of 20" apart. The perches nearest the walls should be a minimum distance out of 15". These can be used as coming from the mill, and though there is no objection to chamfering the raw edges, perches should not be rounded or planed to make them smooth. Perches should be 20"-24" from the floors, and supported on 3" x 2" bearers, or on 3" x 1" battens executing the dual purpose of bearers and battens for wall sheeting.

NESTS.—Nests are in a continuous line broken up into compartments 13" wide, 8" high, by 10" internal measurements. The nest group is formed from 30"-wide 26g. Queen's Head sheet, fastened to 2" x 1" battens, the latter being carried on brackets formed from 3" x 1" timbers. The brackets are bolted together, and to the vertical studding, with $\frac{3}{8}$" cup-headed bolts with nuts and square washers.

The lid is formed up in 2" x 1" battens fitted with 18"-wide strips of 25g. Queen's Head sheet. Each flap covers five nests, and is hinged with two 6" T. hinges.

A hinge guard is provided at the front of the nests, formed up of 3" x 1" timbers and fixed with 6" T. hinges. This prevents hens from entering the nests at night, and at the same time being used in the daytime as an entry perch for the nests.

RUNS.—This class of house can be used with a bare or grass run or open range. If grass runs are divided open it will be necessary to allow 175 square feet for each hen, which means an acre for 250 fowls, while if bare runs are used, 50 to 60 square feet per hen will be sufficient.

DOORS.—Frame up one 6' 6" x 2' 6" door in 3" x 1" timbers and cover with 1" mesh 19g. galvanized wire netting.

WIRE MESH.—Cover the open front of the shed with 2" mesh 18g. galvanized wire netting.

LIST OF QUANTITIES

TIMBER:

4" x 2"	Rafters, 6/19' 6"	Linear ft.	117
3" x 2"	Posts, 4/10', 5/8', 2/9'	" "	107
	Top plates, 3/22'	" "	66
	Roosts, 8/11'	" "	88
	Roost support, 1/7'	" "	7
3" x 1"	Battens (roof), 5/22'	" "	110
	Battens (side), 1/22', 4/16	" "	86
	Nest and Perch, 1/19', 2/10'	" "	39
	Brackets, perch and nest, short pieces	" "	40
	Door	" "	20
2" x 1"	Nest Battens, 4/19'	" "	76
12" x 1"	Division board, 1/22'	" "	22

GALVANIZED IRON:

26g. 10-3" corrugations Red Orb:		
Roof, 10' lengths		19
Front, 10' lengths		2
26g. Queen's Head:		
Nests		7
4" quadrant guttering, 6' lengths		4
2" downpipe, 6' lengths		2

WIRE NETTING (GALVANIZED):

72" x 2" x 18g., front of house	ft.	20
30" x 1" x 19g., for door	"	6

CONCRETE: $1\frac{1}{2}$ yards:

Cement	bags	6
Sand	cu. yds.	$\frac{3}{4}$
Aggregate	cu. yds.	$1\frac{1}{4}$

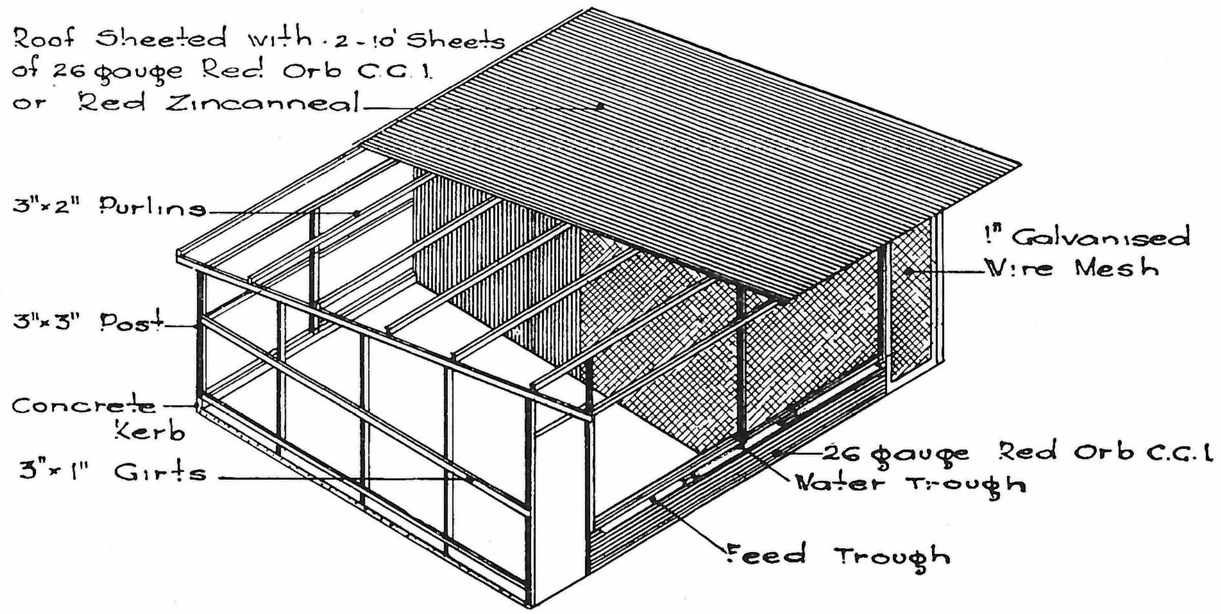
Nails, hinges, strapping as required.

POULTRY SECTION

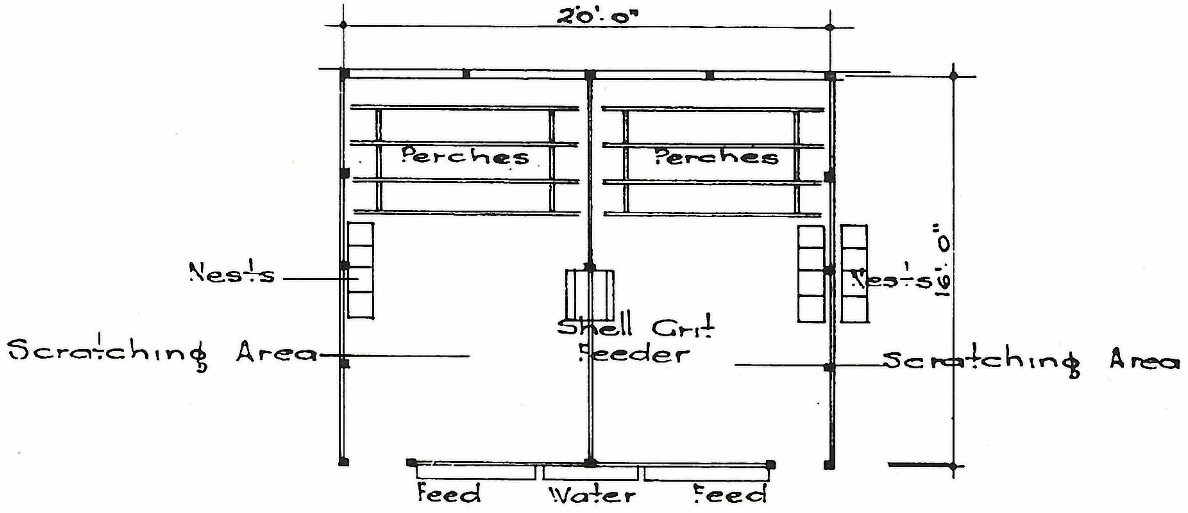
LYSAGHT'S COUNTRY SERVICE

SHEET 4663

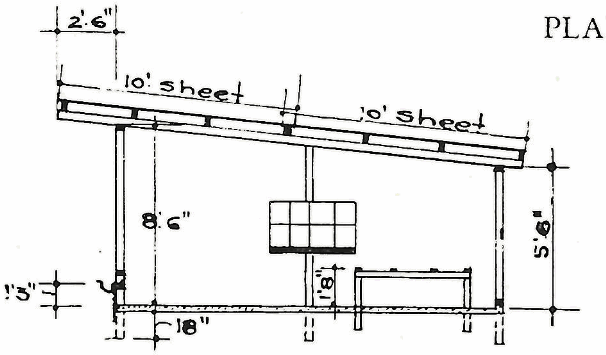
INTENSIVE LAYING HOUSE — 100-BIRD SECTION



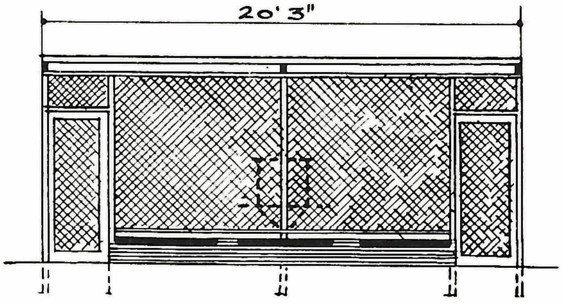
ISOMETRIC VIEW



PLAN



CROSS SECTION



FRONT ELEVATION

POULTRY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4663

INTENSIVE LAYING HOUSE — 100-BIRD SECTION

GENERAL.—Under the Intensive system the birds are kept confined in the houses at all times. A common type of construction is that of the long shed divided into a series of units or compartments. Such a unit is that illustrated overleaf. As can be seen, each unit is divided in half, partly by sheeting and partly by wire mesh. This latter division into halves is not essential, but is preferred by many farmers. An allowance of 4 sq. ft. per bird should be allowed, and 20' x 16' building illustrated overleaf is suitable for 80-100 birds.

POSTS.—Posts are 3" x 2", sunk 18" into the ground, with the exception of corner posts, which shall be 3" x 3". That portion sunk in the ground and 12" above is to be coated with Creosote or any other white ant deterrent compound. In placing posts in the ground, leave a space 6" deep, 12" diameter, when the soil is rammed, in order to pour a blob footing when placing the concrete floor. Spacing of posts not to exceed 5'. 3" x 1" battens are checked in to take wall sheeting.

CONCRETE.—Pour a concrete floor and 4" high curb, of 5:3:1 mix concrete. The floor is to be 2"-3" thick, and the curb 3" wide, 4" high, poured against the rear sheeting of the shed.

TIMBER FRAMING.—Frame the roof up in

3" x 2" plates.
3" x 2" purlins.

Halve 3" x 1" battens into vertical studding to carry the wall sheeting.

ROOF SHEETING.—The roof is sheeted with 10' lengths of 10-3" corrugations Red Orb or Red Zincanneal sheet, side-lapped 1½ corrugations and end-lapped a minimum of 6". Fix in position with spring-headed roofing nails through the crest of every second corrugation for end fixings and every fourth corrugation at intermediate points.

WALL SHEETING.—Outside and division walls are sheeted with 26g. 10-3" corrugations Red Orb or Red Zincanneal sheet.

5' sheets to rear walls laid vertically.
8' and 6' sheets to sides and division walls laid vertically.

One 8' sheet cut in half lengthwise, lapped, and sunk into the ground. This sheet covers the front of the shed below the watering and feeding troughs.

GUTTERING.—Provide a 4½" 24g. Queen's Head galvanized iron beaded edge quadrant type gutter at the rear of the shed. Guttering is provided normally in 6'-8' lengths, to be lapped 1½", double riveted, soldered, and secured to roofing timbers with 16g. galvanized brackets.

DOWNPIPE.—Provide a short length of 24g. 3" diameter Queen's Head galvanized iron sheet downpipe with the necessary bends and joints to carry the water away to galvanized iron tank or to a ground sump and drain.

PERCHES.—Perches are to be of 3" x 2" hardwood battens, placed a minimum of 20" apart. The perches nearest the walls should be a minimum distance out of 15". Perches can be used as coming from the mill, and while there is no objection to chamfering raw edges, perches should not be rounded or planed to make them smooth. Perches should be 20"-24" from the floor, and are supported on 3" x 2" scantlings.

NESTS.—Nests are placed at the side of the shed or division wall, eight per 50 birds. Each nest is approximately 13" deep x 10" x 8" high, the group of eight to be formed from 26g. Queen's Head sheet, fastened where necessary to 3" x 1" battens. The nest group is fastened to the vertical studding and girts by galvanized screws and washers.

FEEDER AND WATER TROUGHS.—In order to feed and water the birds with a maximum of ease, a feeding panel is provided at the front of the shed. Two 3" x 1" battens are carried the length of the shed, spaced 4" apart. The wire netting for the front of the shed is fixed to the top batten. To the bottom battens are fixed two feed troughs, and automatic water troughs some 10" above floor level. These troughs are made from 5" quadrant gutter, fitted with end pieces and made up into convenient lengths, e.g., mash trough 6' long, corresponding to standard length of guttering; water trough 4', from half an 8' length of guttering.

SHELL GRIT FEEDERS.—A shell grit self-feeder with feeding trough each side is placed midway between the half sections.

DOORS.—Provide a door to each half unit 6' 6" x 2' 6", framed up in 3" x 1" timber and covered with 1" mesh 19g. galvanized wire netting.

LIST OF QUANTITIES

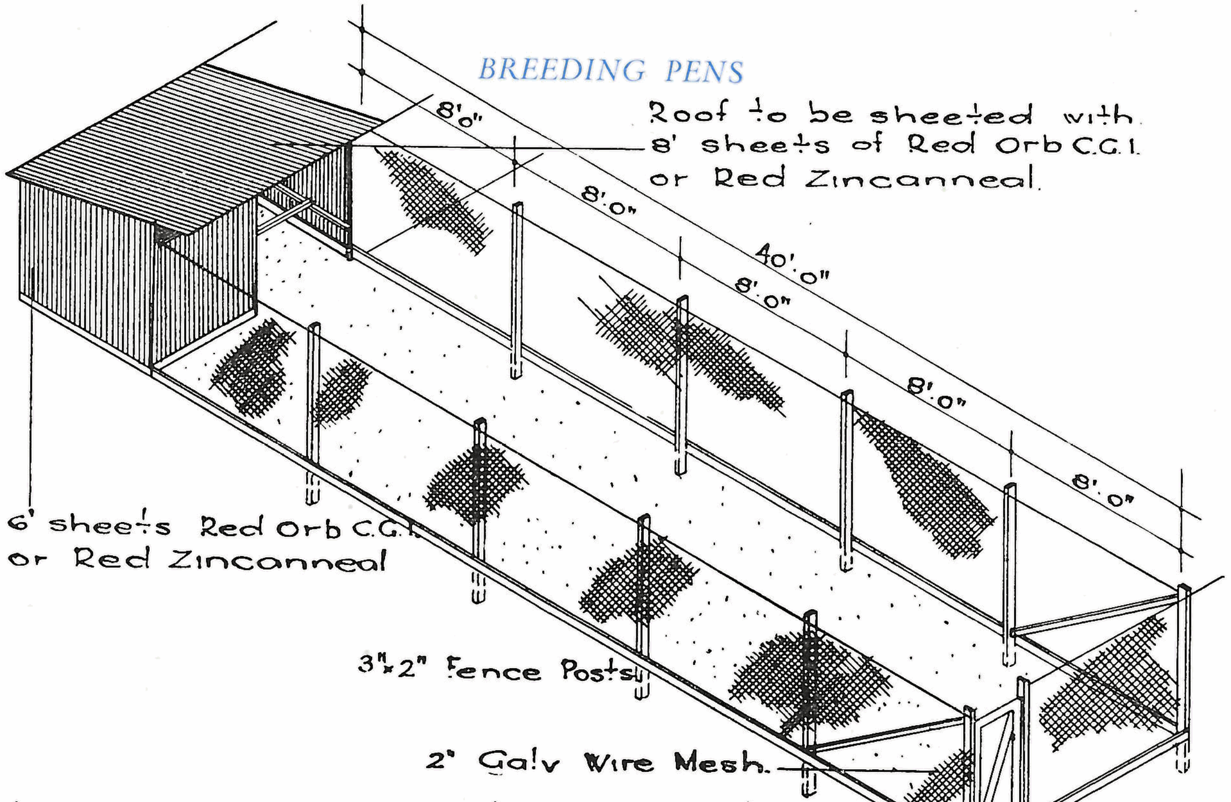
Material	Per Single Unit	For each additional Unit	Total 5-Unit House
TIMBER:	Lin. ft.	Lin. ft.	Lin. ft.
3" x 3" Posts, 2/10', 2/7'	34	17	102
3" x 2" Posts, 3/10', 2/9' 6", 3/9', 3/8', 3/7'	113	96	497
Top plates, 2/21', 3/19' 6"	100	81	424
Purlins, 7/20' 6"	144	144	720
Roosts Supports, 6', 3'	32	32	150
Roosts, 8/10'	80	80	400
3" x 1" Battens or girts, 6/16', 2/20', 2/14'	164	132	692
Feeding passage	30	30	150
Framing, nests and feeders	30	30	150
Door	36	36	180
GALVANIZED IRON:			
26g. 10-3" corr. Red Orb:			
Roof, 10' lengths	8	8	41
Sides, 8' lengths	5	4	29
6' lengths	11	3	58
Partition, 6' lengths	4	—	20
Queen's Head 6' x 36" x 26g.	2	—	10
4½" quad. guttering, 6' lengths	4	—	18
2" downpipe, 6' lengths	1	—	2
WIRE NETTING:			
72" x 2" x 18g. Front of house lin. ft.	19	—	95
Partition, lin. ft.	10	—	50
30" x 1" x 19g. For door, lin. ft.	12	—	60
CONCRETE, cu. yds.	2-3	—	3
Cement, bags	3	—	14
Sand, cu. yds.	1-3	—	1½
Aggregate, cu. yds.	2-3	—	3
Nails, hinges, strapping, bolts, as required.			

POULTRY SECTION

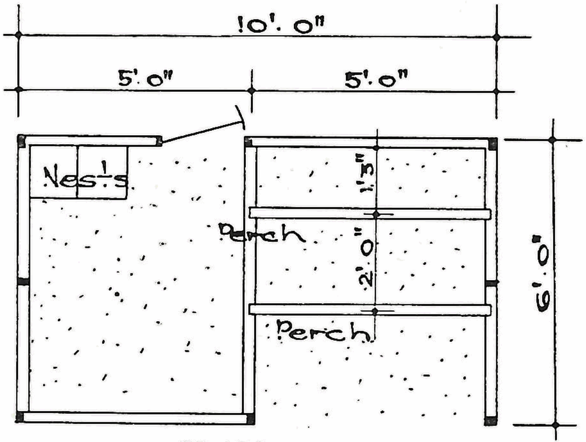
LYSAGHT'S
COUNTRY SERVICE

SHEET 4672

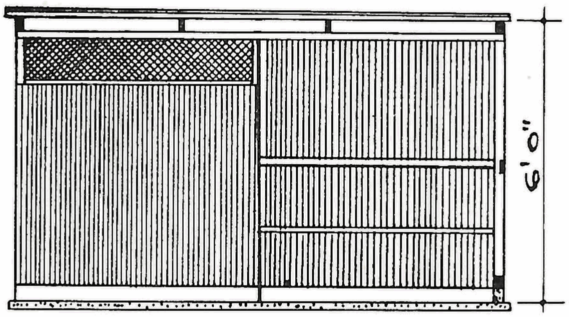
BREEDING PENS


8'0"
8'0"
40'0"
8'0"
8'0"
8'0"
Roof to be sheeted with 8' sheets of Red Orb C.G.I. or Red Zincanneal.
6' sheets Red Orb C.G.I. or Red Zincanneal
3"x2" Fence Posts
2" Galv Wire Mesh.

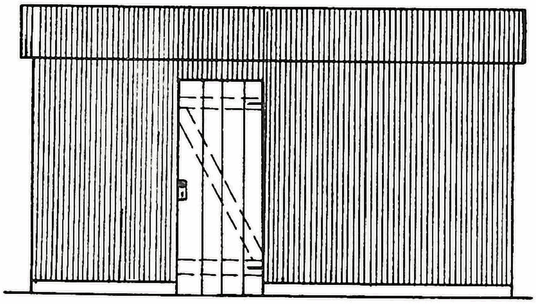
ISOMETRIC VIEW



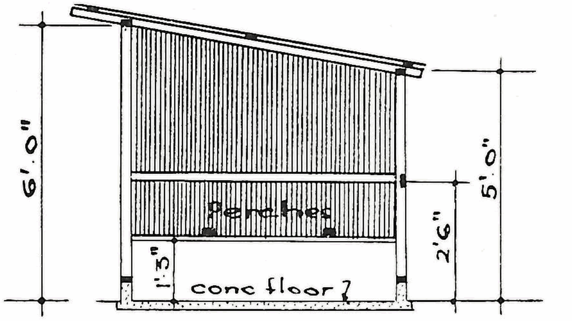
PLAN



FRONT ELEVATION



REAR ELEVATION



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POULTRY SECTION

LYSAGHT'S COUNTRY SERVICE

SHEET 4672

BREEDING PENS

GENERAL.—The sketch overleaf illustrates a single unit of a run of breeding pens, as advocated by the N.S.W. Department of Agriculture. A run of such units may extend to an overall length of 100', but beyond this it is better to have two installations. Each unit is 10' wide, and includes a shed 10' wide x 6', the height at the front being 6', at the rear 5'.

Each pen is divided into two parts, one half for scratching and laying, and the other half for roosting.
As illustrated, each unit has an outside yard 40' long by 10' wide.

FLOORS.—Floors are formed of cement-rendered concrete, 2" depth, 5 parts metal, 3 parts sand, and 1 part cement. A 4" high concrete curb is provided under the bottom plate.

FRAMEWORK.—The shed is framed up in
3" x 2" bottom and top plates.
3" x 2" studs and rafters.
3" x 1" battens for carrying roof sheeting.
3" x 1' girts to carry wall sheeting.

Girts are provided at the mid points of sides and rear walls, while at the front of the shed girts are provided at the mid point of the wall, and at the top of the corrugated sheets.

ROOF SHEETING.—The roof is sheeted with 8' lengths of 26 gauge 10-3" corrugations Red Orb or Red Zincanneal sheet, lapped one corrugation. Sheets are fixed to battens with spring-headed roofing nails pierced through the top of every fourth corrugation at the intermediate battens.

WALL SHEETING.—The walls are sheeted with 26g. 10-3" corrugations Red Orb or Red Zincanneal sheet, lapped one corrugation. Sheets are fixed to the girts with spring-headed roofing nails through the top of every second corrugation at plates or top girts, and through every fourth corrugation at intermediate girts.

5' sheets are used at front and rear of shed.
6' sheets are used at the sides, trimmed to required size.

PERCHES.— Two 3" x 1" perches are placed across the roosting section. The first is 15" from the back of the shed, and 24" is allowed between the first and second. One end of the perch is supported on a dwarf concrete wall, 15" high, running from front to back of the house at the intersection of the pen and closed spaces; this wall divides the scratching area from the roosting quarters, and confines scratching material to its own compartment.

NESTS.—Twin nests are provided, fabricated from 26g. Queen's Head or Zincanneal flat sheet, fixed to the walls by screws, or nailed to timber studding. Each compartment is 14" long, 10" wide, and 6"-7" deep. One 72" x 36" x 26g. standard sheet will make two sets of twin nests or sufficient nests for two pen units.

DOOR.—A 2'-wide door, the height of the wall, is provided at the rear of the scratching section, opening out on to a lane at the back of the breeding pen. This is framed, braced and sheeted in 4" x 1" timbers, and swung with two 6" T. hinges. Provide a suitable fixing for closing the door, e.g., hasp, staple, and peg.

FENCE.—A 40' length of outside yard is provided to each pen unit.

Corner and gate posts are 8' lengths of 4" x 2" hardwood. All other posts are 8' lengths of 3" x 2" hardwood, placed 8' apart and sunk 20" in the ground, the wire netting being fixed to the 2" face. That portion sunk in the ground and 6" above ground level should be coated with creosote or another ant deterrent compound, before placing.

3" x 1" hardwood battens are then nailed all around the bottom of the yard. To these 72" x 2" mesh x 18g. or 19g. netting is tacked. This results in the full height of the wire netting above the level of the ground being used.

GATES.—The gates are constructed with 3" x 1" timber frames covered with 1" mesh wire netting. These are swung on 4" x 2" gate posts with 6" T. hinges.

YARD AUXILIARIES.—Automatic water feed troughs, shell grit pens, dust baths, etc., are provided as required.

LIST OF QUANTITIES

Material	Per Single Pen	For each additional Pen	Total for 5-pen Unit
TIMBER:	Lin. ft.	Lin. ft.	Lin. ft.
4" x 2" fence posts (8' long)	24	16	88
3" x 2" bottom plates	23	17	91
Studs (5' 4" and 4' 4")	44	30	164
Top plates	21	21	105
Rafters, 4/8' per unit	32	24	128
Fence (8/8' long plus 2/11" diagonals)	86	43	258
4" x 1" door	66	66	330
3" x 1" battens, 3/10' 4"	31	31	155
Girts	25	18	97
Perches, 2/5' 6"	11	11	55
Fence	90	50	292
Gate	25	25	125
Miscellaneous	5	5	25
GALVANIZED IRON OR ZINCANNEAL:	Sheets	Sheets	Sheets
26g. 10/3" Red Orb:			
Roof, 8'	4	4	21
Sides, 6'	2½	2½	16
Front and rear, 5'	6	6	30
Queen's Head, 26g. 72" x 36"	½	½	3
NETTING:	Lin. ft.	Lin. ft.	Lin. ft.
Fence—72" x 2" mesh x 18g.	88	48	280 (2 rolls)
Gate—30" x 1" mesh x 19g. (Sheeting to Panel)	7	7	35
CONCRETE—1/3 cubic yard per unit:			
Metal, cubic yards	1/3	1/5	2
Sand, cubic yards	1/6	1/6	1
Cement, bags	2	2	10
Nails, hinges, strapping as required.			

LYSAGHT
ORB
AUSTRALIA

Websdale, Shoosmith Pty. Ltd., Printers, 117 Clarence Street, Sydney.

LYSAGHT'S
COUNTRY SERVICE

TANKS AND TANKSTANDS

LYSAGHT
ORB
AUSTRALIA

JOHN LYSAGHT (AUST.) PTY. LTD.

FOREWORD

Where piped water supplies are not available, established practice is to build storage tanks of corrugated galvanized iron, varying in size from 800-1,000 gallon tanks for small cottages, to the large 20,000-30,000 gallon tanks for sheep and cattle holdings.

Australia is naturally a dry country, and every endeavour should be made to conserve all available water, particularly rain water. Every shed, no matter how small, should be fitted with guttering and downpipe, to carry water away to corrugated galvanized iron tanks. Buildings can be so grouped that overhead pipe lines of galvanized downpiping carry water to central storage tanks of 10,000-15,000 gallons capacity.

The care and maintenance of tanks is an important feature of their life. While there is often little choice regarding the site of a tank, an endeavour should be made to place the tank on the protected side of a building, away from any trees which might clog up the strainer with fallen leaves and contaminate the water. It is not desirable that the tank should be exposed unprotected to the full rays of the sun.

Tanks should be well ventilated, either by leaving the top open, or providing air vents and one or more openings covered with rust-proof mosquito wire covering. The object of this ventilation, in all cases, is to keep the air cool inside the tank.

If two or more tanks are to be connected to a common outlet, their installation requires some care to avoid a somewhat unusual kind of corrosion, which is known to occur, but which is not fully understood. This trouble arises when the water to one tank flows from another; rapid failure of a tank with the indirect water supply may occur, though the effect is sometimes reversed. Each tank in such an installation should have its own water supply from the roof, with the water discharging to each tank balanced as far as is practicable. If this cannot be done, each tank should have a separate outlet, and the second should be filled by the overflow from the first. These recommendations apply with particular force when a new tank or a replacement is added, in this manner, to an existing installation; if all tanks do not have separate inlets, there is a strong possibility of rapid failure of the new tank, irrespective of its position.

Lysaght's Blue Orb Corrugated Iron is recommended for the walls and "Queen's Head" for the top and bottom of the tank. Red Orb is a harder sheet for roofing purposes, and will not curve satisfactorily for tanks. For tankmaking, Blue Orb sheets are produced in 8/3" corrugations, 18G-24G, and in lengths 6'-12'. The wider 10/3" corrugation sheets are seldom used, as few curving rolls in Australia can handle 10 corrugations.

Almost any diameter tank can be obtained by a suitable choice of combinations of the various length sheets between 6'-12'. The height, on the other hand, is controlled by the coverage value of the standard 8/3" corrugations sheet. This, when applied with one corrugation lap, gives a height of 2' per ring. Consequently, tanks are 2, 4, 6, 8 feet, etc., high.

It might well be asked whether a series of tanks, corresponding to 10/3" corrugations sheet can be made, viz., tanks 2½, 5, 7½, 10 feet, etc., high. This will depend entirely on the future extension of curving rolls to handle 10 corrugations sheet.

Care in the initial manufacture of the tank is well repaid in its ultimate life. Sheets should be curved by a number of light passes, rather than by fewer more drastic passes through the rolls. It is most desirable that the rolls should be maintained in good condition. Experience indicates that a better and more even grip of the sheets is obtained if the flutes of the curving rolls are slightly shallower than the flutes of the sheet, because the standard ¾" depth of corrugation includes twice the thickness of the sheets. As curving is principally applied to 24G, the recommended depth of flute for curving rolls is 11/16" bare (actually 43/64").

It is strongly recommended, in all cases, where bore, well, river, or water known to be corrosive to galvanized iron, is used, that the tank should be painted before use. Anti-corrosive oil-bound zinc-base paints made by reputable manufacturers have been found satisfactory. Care should be taken to ensure that the paint has thoroughly dried before permitting water to enter the tank, otherwise the water will continue to be tainted until the whole of the initial fill has been drained and any water penetrating the oil film has evaporated. Where bitumen-base paints are used, it is advisable to let the first filling run to waste.

As an alternative, the tank should be protected with a coating of cement and linseed oil to the following mix:—

> 2½ lb. cement, 1 pint boiled oil, small addition of terebene or gold size.

This mixture should be well stirred all the time it is being applied.

A multitude of tank-stand types exists, from the simplest ground level types to scientifically designed elevated tank-stands. Data sheets on tank-stands serve to illustrate typical examples. Certain sized steel tank-stands are made commercially in prefabricated units, and any owner contemplating an elevated stand 20' or higher would be well advised to consider a prefabricated unit.

Any special problem can be referred to Lysaght's Service Department, where our designing staff will be only too pleased to carry out a full investigation.

This section, though included as part of the Country Service Manual, will be supplied, on request, as a separate brochure.

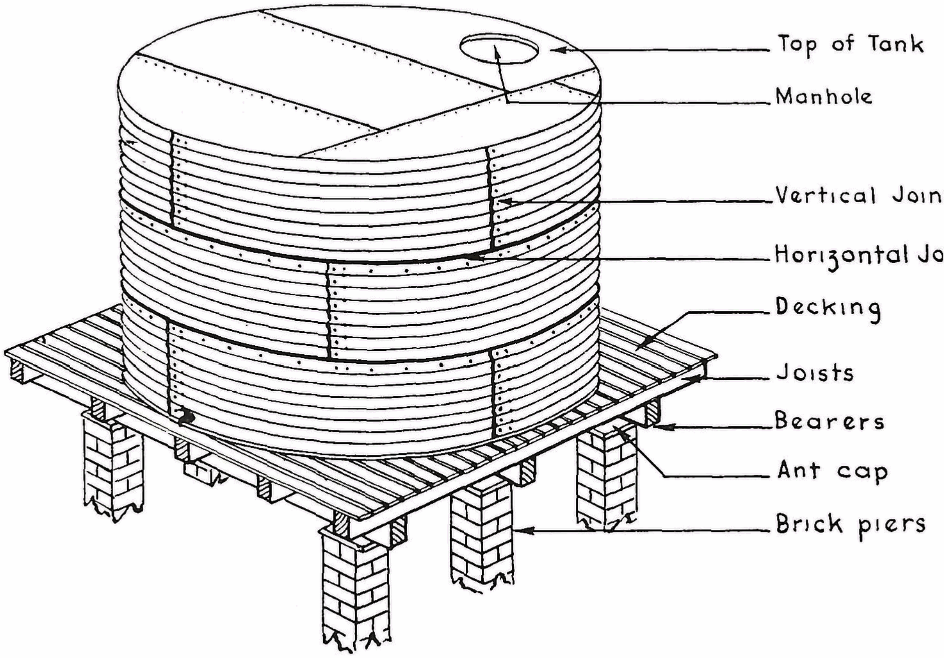
JOHN LYSAGHT (AUST.) PTY. LTD.

TANKS AND
TANKSTANDS

LYSAGHT'S
COUNTRY SERVICE

SHEET 4911

CORRUGATED GALVANIZED IRON TANKS



GENERAL.—Circular tanks of Corrugated Galvanized Iron are the most efficient and economical method of storing water. Any desired size tank can be built by a judicious choice of Lysaght's Orb corrugated sheets, and overleaf is shown in tabular form a range of tank sizes in common use, up to 33,000 gallons.

WALLS.—The walls are made from Lysaght's Orb sheets curved to suit the required diameter of the tank. For sizes up to 10,000 gallons 24g. sheet is suitable, but above this size a heavier gauge sheet should be used.

TOP.—Open-top tanks are preferable, but the protection of drinking water generally means that the tank must be covered. Up to 10,000 gallons capacity the roof can be made of 26 gauge Queen's Head galvanized sheet, either flat-topped or conical, depending upon the user's preference. Over 18' diameter (10,000 gallons) the top generally takes the form of hessian or other fabric, covering a mesh support (e.g., chicken wire).

BOTTOM.—The bottom is made of 24 gauge Queen's Head flat sheet, up to 10,000 gallons. Over this size the thickness shall be the same as the sheet in the bottom ring of the tank.

RIVETING.—Rings are lapped one corrugation. Horizontal joints are to be riveted with 3/16" diameter by ⅜" galvanized tank rivets and washers, at 6"-8" centres. Generally all vertical joints of the wall sheets are given a 4" lap, and riveted with two rows of 3/16" diameter galvanized tank rivets at 2½" pitch. Over 5,000 gallons the lap must be increased according to size of tank.

Top and bottom sheets can be seamed, or sheets lapped 1½" and riveted with No. 8 Tinmen's rivets spaced at 2" centres. For 22 gauge sheets use No. 9, and for 20g. sheets use No. 10 Tinmen's rivets.

SOLDERING.—All wall sheets on both horizontal and vertical joints, and rivet heads are to be soldered after riveting. The edge of the bottom sheet is to be flanged up and turned over the lip of the wall sheet, flattened, and soldered.

FITTINGS.—Fittings can be purchased with special flanges to fit the corrugations of the tank. The latter are recommended for tanks over 5,000 gallons.

Alternatively the outlet connection is made from an ordinary piping socket reinforced by a sheet metal boss sweated to the tank. This carries the outlet cock.

A 15" manhole is made for the top before it is placed on the tank, and the manhole fitted with a removable strainer and gauze.

A 2" overflow close to the top is desirable.

ASSEMBLY.—The fitting of one ring to the other can be done as described in Sheet 4912, "The Construction of a 200 Gallon Tank," by the use of a tourniquet, or by slipping one ring over the other. This is done by making the circumference of the outer ring ¼" greater than the inner, trimming the inner ring slightly and levering this inside the outer. In the case of tanks over 1,000 gallons capacity, fabrication is assisted by rolling the tank during construction on the wheels of a trolley turned upside down.

PAINTING.—Where there is any suspicion of the water containing impurities the tank should be painted internally. The inside of tanks can be painted with boiled oil and cement, or failing this, zinc oxide paint or any of the proprietary lines sold by reputable firms. After weathering, an external coating of paint also adds to the appearance of the tank, particularly if it is an adjunct to a residence.

The practice of tarring the inside of tanks and troughing should be regarded with suspicion. Some tars contain acids which provoke the corrosion of Galvanized Iron. Unless local experience has definitely shown a particular tar to be strongly protective, it should not be used.

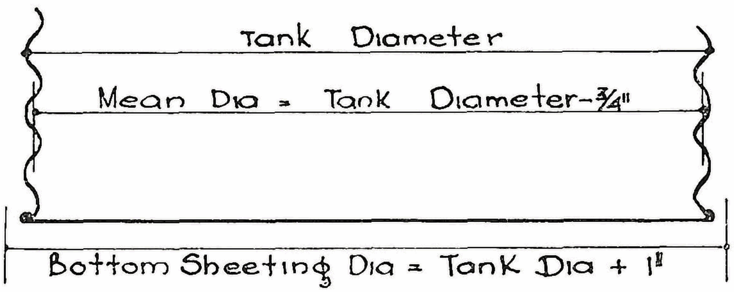
NOTE.—When two or more tanks are connected at the bottom, so that transfer of water from one tank to another is possible, there is a possibility of rapid corrosion. As far as possible each tank should have its own outlet and water supply from the roof. If practical considerations make the connection of tanks to a common main desirable, separate water supplies should be provided for each tank. This recommendation applies with particular force to subsequent additions of a tank or to replacements.

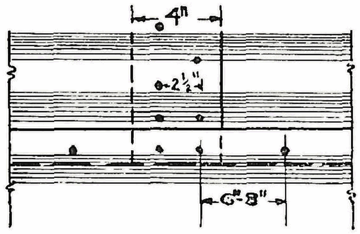
TANKS AND TANKSTANDS

LYSAGHT'S COUNTRY SERVICE

SHEET 4911

CORRUGATED GALVANIZED IRON TANKS


Tank Diameter
Mean Dia = Tank Diameter-¾"
Bottom Sheeting Dia = Tank Dia + 1"



RIVET SPACING & LAP

CORRUGATED GALVANIZED IRON TANKS IN COMMON USE

Capacity of Tank Gallons	Height Feet	Diameter	Walls—8/3" Corrugations Orb Sheets			Bottom and Roof			
						6' x 36" Queen's Head Sheets		Alternative widths of 6' Sheets	
			Number	Length	Gauge	Bottom 24G.	Roof 26G.	Bottom	Roof
100	2' 0"	3' 2"	1	10' 0"	24G.	1	1	1—24"	1—24"
200	4' 0"	3' 2"	2	10' 0"	24G.	1	1	1—24"	1—24"
300	6' 0"	3' 2"	3	10' 0"	24G.	1	1	1—24"	1—24"
300 Squat	4' 0"	4' 0"	2 2	6' 0" 7' 0"	24G.	1	1	1—36"	1—36"
400	6' 0"	3' 8"	6	6' 0"	24G.	1	1	1—36"	1—36"
400 Squat	4' 0"	4' 4"	4	7' 0"	24G.	1	1	1—36"	1—36"
500	6' 0"	4' 0"	3 3	6' 0" 7' 0"	24G.	1	1	1—36"	1—36"
500 Squat	4' 0"	4' 11"	4	8' 0"	24G.	2	2	2—30"	2—30"
600	6' 0"	4' 4"	6	7' 0"	24G.	1	1	1—36"	1—36"
600 Squat	4' 0"	5' 3"	2 2	8' 0" 9' 0"	24G.	2	2	1—36" 1—30"	1—36" 1—30"
800	6' 0"	5' 0"	6	8' 0"	24G.	2	2	1—36" 1—30"	1—36" 1—30"
800 Squat	4' 0"	6' 3"	4	10' 0"	24G.	2	2	1—36" 1—30"	1—36" 1—30"
1,000 Small	6' 0"	5' 7"	6	9' 0"	24G.	2	2	2—36"	2—36"
1,000 Full	6' 0"	5' 11"	3 3	9' 0" 10' 0"	24G.	2	2	2—36"	2—36"
1,000 Squat	4' 0"	6' 11"	4	11' 0"	24G.	3	3	1—36" 2—30"	1—36" 2—30"
1,000 Squat	4' 0"	7' 4"	6	8' 0"	24G.	3	3	3—36"	3—36"
1,200	6' 0"	6' 3"	6	10' 0"	24G.	3	3	1—30" 2—24"	1—30" 2—24"
1,500	6' 0"	7' 1"	3 6	7' 0" 8' 0"	24G.	3	3	2—30" 1—36"	2—30" 1—36"
2,000	6' 0"	8' 3"	9	9' 0"	24G.	4	4	3—36" 1—30"	3—36" 1—30"
3,000	6' 0"	10' 0"	3 9	9' 0" 8' 0"	24G.	6	6	Above 2,000 gallons only 36" wide sheets are considered.	
4,000	6' 0"	11' 6"	6 6	10' 0" 9' 0"	24G. 24G.	7	7	Below 2,000 gallons manufacturers supplying tank material for erection will generally supply width of sheets as above and not complete 6' x 36" sheets.	
5,000	6' 0"	13' 0"	9 6	9' 0" 8' 0"	24G. 24G.	9	9		
10,000	6' 0"	18' 0"	18	10' 0"	22G.	17—22G.		As tanks of 10,000 gallons capacity and above are not usually provided with tops, no material is included in this data for same.	
15,000	6' 0"	22' 6"	12 12	10' 0" 9' 0"	22G.	26—22G.			
20,000	6' 0"	25' 6"	15	10' 0" 9' 0"	22G.	32—22G.			
30,000	6' 0"	32' 6"	33	10' 0"	20G.	50—20G.			

CONSTRUCTION OF A 200-GALLON CORRUGATED GALVANIZED IRON TANK

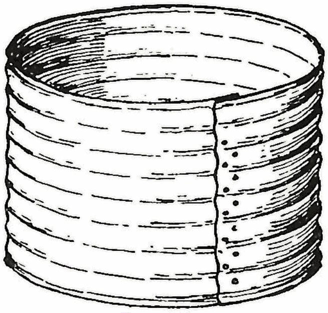


Fig. 1.

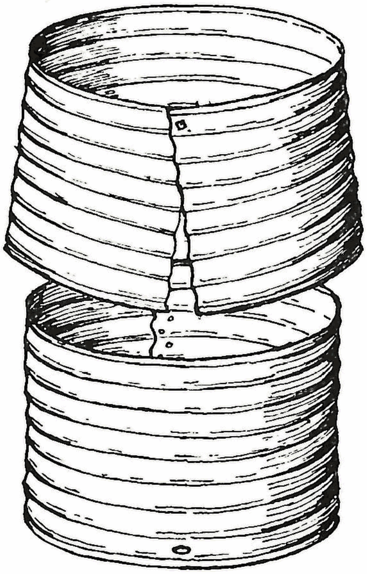


Fig. 2.

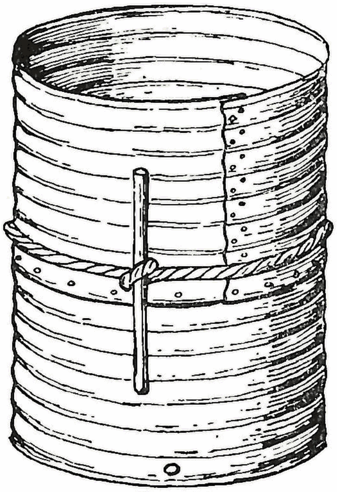


Fig. 3.

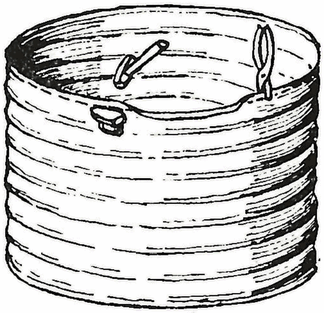


Fig. 4.

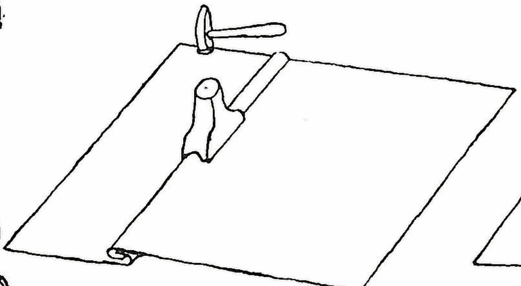


Fig. 5.

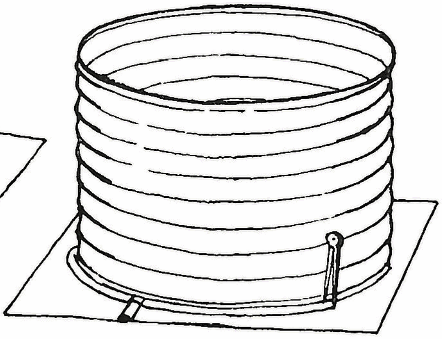


Fig. 6.

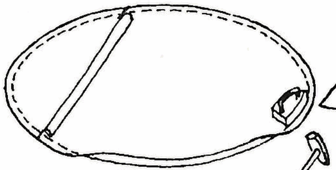


Fig. 7.

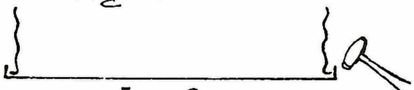


Fig. 8.

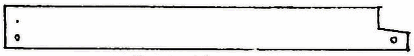


Fig. 11.

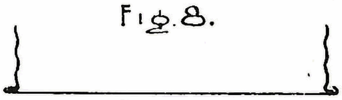


Fig. 9.

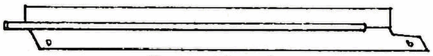


Fig. 12.

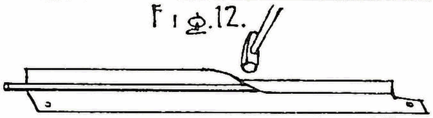


Fig. 15.

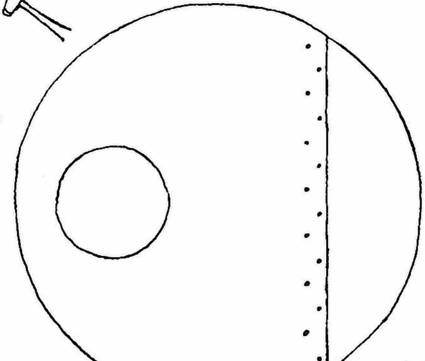


Fig. 10.

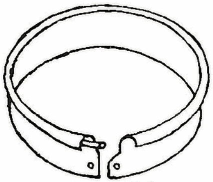


Fig. 14.

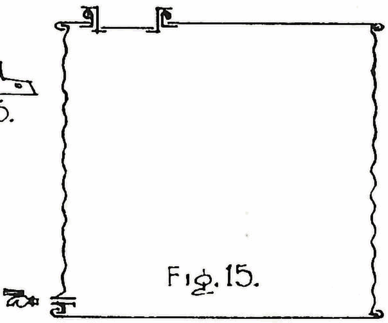


Fig. 15.

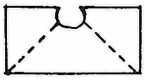


Fig. 16.

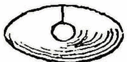


Fig. 17.

TANKS AND
TANKSTANDS

LYSAGHT'S
COUNTRY SERVICE

SHEET 4912

CONSTRUCTION OF A 200-GALLON CORRUGATED GALVANIZED IRON TANK

GENERAL.—Corrugated galvanized iron tanks are the most efficient and economical method of storing water. In order to illustrate the method of fabrication, a 200-gallon tank, as illustrated on reverse side of sheet, will be taken as an example.

WALLS.—For a tank of 200-gallon capacity, two 10' lengths of Lysaght's 8-3" corrugations 24 gauge Orb sheet are necessary, curved to a full circle and joined by a 4" lap (see fig. 1).

The method most often adopted in assembly is to clamp the sheets with a small hand vise at the top, then insert several rivets or assembly bolts at each end, after which the hand vises may be removed. Small galvanized 3/16" roof bolts can be used as assembly bolts. The first ring of the tank can then be riveted. The second ring of the tank is fastened at the top with an assembly bolt, and then placed over the first cylinder and lowered until the required lap of one corrugation is reached (fig. 2). A rope is then passed around the body of the tank with a short piece of pipe to form a tourniquet or twitch, and tightened until the ring is in position (fig. 3). Punching and riveting are then proceeded with. Remember that the top of this structure is the bottom of the finished tank. Some manufacturers dispense with the tourniquet and fabricate inside ring circumference $\frac{1}{4}$" less than outside ring circumference, and slip one under the other. A tank that consists of two rings only should have the vertical seams on opposite sides. When building tanks of more than 4' (two rings) high, the vertical seam on the third ring should be over that of the first ring. Taking the line of corrugations as a guide, the joint around the centre of the tanks is easily adjusted, and should have a single line of rivets about 8" apart. The next operation is to flange the body of the tank in preparation for the fitting of the bottom, and this is done as in fig. 4. A line is drawn half an inch from the edge all round and the flange beaten over a "hand-stake." Where this tool is not available an ordinary laundry flat iron or piece of railway line makes a good substitute.

RIVETING.— The holes for the rivets are punched from the outside with a 3/16" diameter parallel prick punch, a piece of hardwood being held on the inside as a "dolly." The rivets are distributed one to each corrugation, and put in the holes from the outside, an iron "dolly" being held to the heads, the washers placed in position, and drawn up by the use of a rivet set and snapped.

BOTTOM.— One sheet of galvanized flat iron 72" x 36" x 24 gauge will be required for the bottom. As this sheet will not be wide enough for the full diameter of the tank, it will need to be cut and joined together by a grooved seam (fig. 5), or riveted. To form a seam a 5/16" seaming tool or groover is used, the raised side of the seam being kept on top to go inside the tank. To insure a neat fold round the bottom, it is necessary that the grooved seam be thinned down at each end (fig. 7). The tank is then turned over and the flanged end laid on the sheet of iron and scribed round with a small pair of compasses (fig. 6); a margin of $\frac{3}{8}$" being allowed for the turn-up. This method of striking out a tank bottom is usually adopted when compasses sufficiently large are not available. Care should be taken in its operation, for, if the measurements are not fairly accurate, buckling and distortion may occur later. After outlining the bottom, the relative positions of both bottom and tank body should be marked so that they can be fitted correctly later.

The bottom being cut out, it is now placed on a bench and flanged to the line previously marked. This is done by placing the flat iron on the line and knocking the marked margin up to nearly a right angle as shown in fig. 7. Then the body is fitted to the bottom as in fig. 8, and the flange closed down as in fig. 9.

TOP.—One sheet of galvanized iron 72" x 36" x 26 gauge will be needed for the top. This should be cut and joined with a grooved seam as with the bottom, or riveted as in fig. 10. The top is marked as in fig. 6, and a 15" circle for a manhole struck. The flange is then knocked up as in fig. 7 and the manhole fitted as described later. In fitting the top to the walls a similar procedure is followed as with the bottom. Research work on the life of a tank has indicated that an open or well-ventilated top will result in a longer life than obtained when a flat closed top is fitted. A conical shaped top with a mosquito-proof ventilator at the apex may be fitted. Some users prefer this type.

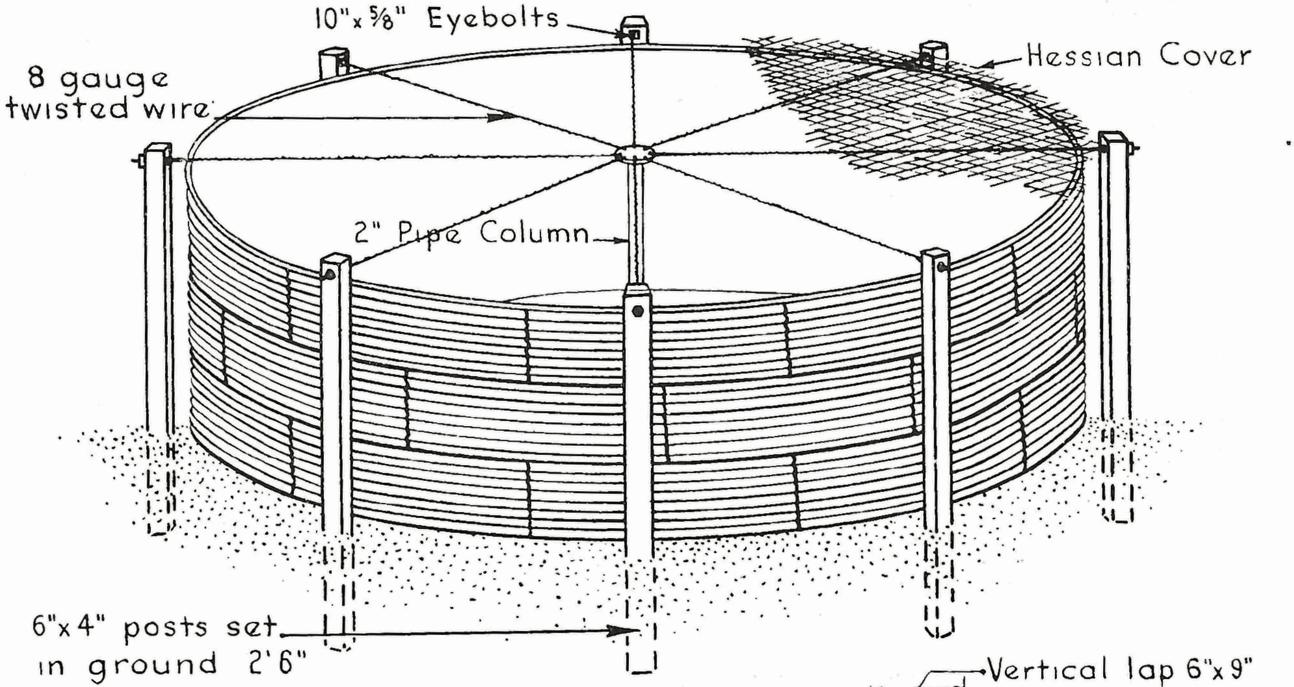
MANHOLE.—This is completed before the lid is placed on to the top of the body. Round the 15" hole cut in the top a strengthening collar is usually placed. This is formed by taking a strip of plain galvanized sheet about 2" wide and of a length sufficient to circle the opening and allow of a 1" overlap, and cut as in fig. 11. It is now turned up as in fig. 12, and a rod of $\frac{1}{4}$" iron of similar length is enclosed, $\frac{3}{4}$" of the round being left protruding at the lap end, to strengthen the joint. Next, round the collar up as shown in fig. 14, and secure with a small rivet. Insert the collar in the mouth and beat the flange over as in fig. 15. A movable strainer (fig. 15) is usually let into the mouth of the tank.

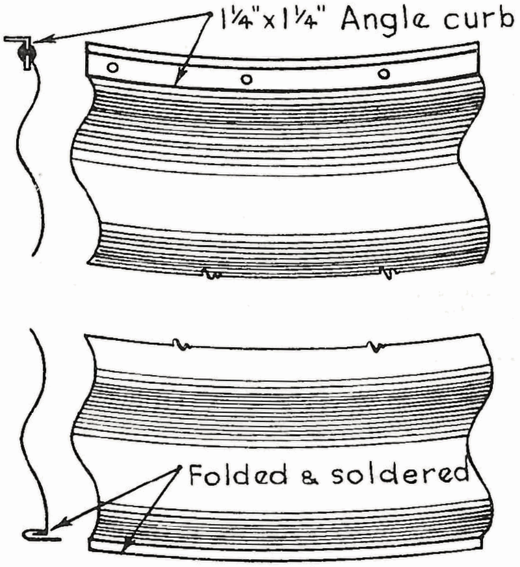
OUTLETS.—A hole should be punched for a brass $\frac{3}{4}$" low-pressure tap in the lowest corrugation of the tank large enough to allow a $\frac{3}{4}$" water pipe socket to enter. The $\frac{3}{4}$" socket is now inserted about a quarter of its length in the hole and soldered firmly in position. The socket is supported by a boss (figs. 16, 17), which is easily made from a piece of plain galvanized iron 9" x 4". Cut a hole $1\frac{1}{4}$" and then shape as in fig. 17, by bending along the dotted lines. The boss will then have a rough resemblance to a funnel, the small end being made to fit tightly around the end of the socket and the other end trimmed to the contour of the tank. Then solder the boss securely to the tank, also the joint, and round the socket. Special fittings are available in hardware stores for making the necessary outlet connections. A 2" diameter hole is cut close to the top and a short piece of 2" downpipe soldered thereto to form an overflow.

SOLDERING.—For soldering the tank a fairly heavy soldering iron weighing not less than 2lb. should be used. All rivet heads and seams on the outside of the tank must be carefully soldered, all joints being wiped dry and free from acid.

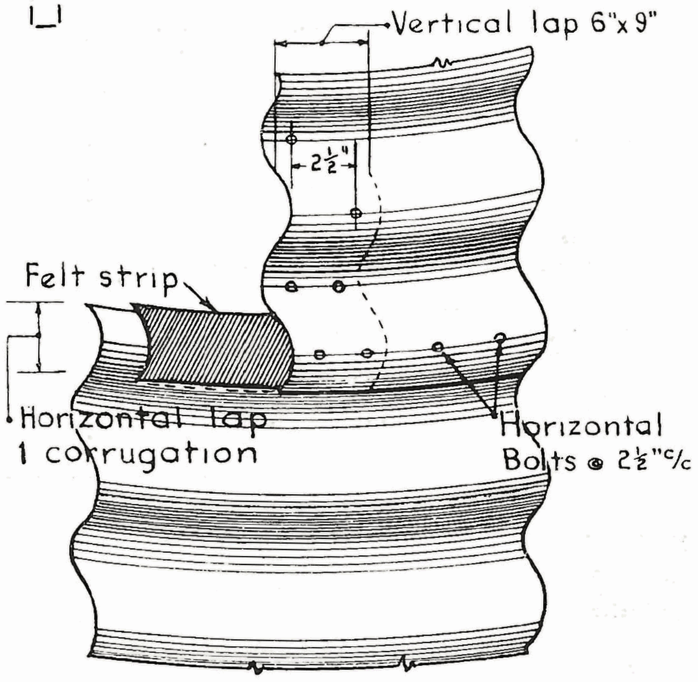
PAINTING.—For protection the inside of tanks can be painted with boiled oil and cement. Failing this, zinc oxide paint can be used, or any of the proprietary paints sold by reputable firms. The practice of tarring galvanized tanks and troughing should be regarded with suspicion. Some tars contain acids which promote the rusting of galvanized iron, and unless local experience has definitely shown the particular tar available to be strongly protective, it should not be used.

CONSTRUCTION OF BOLTED TANKS





DETAIL OF FINISH
TO TOP AND BOTTOM



DETAIL OF VERTICAL
AND HORIZONTAL LAPS

TANKS AND TANKSTANDS

LYSAGHT'S COUNTRY SERVICE

SHEET 4913

CONSTRUCTION OF BOLTED TANKS

GENERAL.— Circular tanks of Corrugated Galvanized Iron with a capacity greater than 10,000 gallons are generally of bolted construction. A number of well-known tank-making manufacturers supply materials for the construction of bolted tanks which are transported to the required site and there assembled. These vary in capacity from 6,000-50,000 gallons.

WALLS.—The walls of such tanks are made from Lysaght's 8-3" corrugations Orb sheets curved to the diameter required. Up to 10,000 gallons capacity 24-gauge sheet is sufficient, but over this capacity a heavier gauge is employed, depending upon both the height and the diameter of the tank. A number of manufacturers recommend 22-gauge sheet for all bolted tanks up to 20,000 gallons, and over this size, 20-gauge, and heavier. Tanks have been made six rings or 12' high, but this necessitates heavy-gauge bottom ring sheets. In general, bolted tanks are either three rings (6ft.) high, or four rings (8ft.) high, resting on an earth-filled ring platform.

BOTTOM.—The bottom of the tank is made from Lysaght's 6' x 36" Queen's Head sheets of the same gauge as the bottom ring, lapped 1½", riveted with No. 8 or No. 9 Tinmen's rivets, and then soldered. Though 6' x 36" sheets are those more commonly held in stock by merchants, it must be remembered that Lysaght's provide a standard 8' x 36" sheet which is more economical to use in large tanks.

The bottom is laid on the platform, marked out to receive the walls, and cut to size. This is then beaten up and over the flanged walls and soldered. Joining of bolted walls and bottom must be done carefully in order to avoid leaks.

BOLTING.—Wall joints are packed with felt strips soaked in oil-red lead, or similar preparations, and bolted together with 9/32" diameter x ⅝" or ¾" galvanized bolts with nuts and washers.

The sheets are lapped 6"-9" on the vertical seams, and bolted together into rings with two rows of bolts inserted on the crest and in the hollows of the corrugations. In large four-ring high tanks, three rows of bolts are used in the lower rings.

On horizontal seams bolts are spaced at 2½" centres.

CURB RINGS.—It is desirable that the top of the tank be reinforced with a 1¼" x 1¼" galvanized steel angle curb ring bolted to the tank with 9/32" or ¼" diameter bolts at 15" centres. If galvanized angle section is not available, normal black angle section can be used, but in either case the ring should be painted before assembling.

TANK PLATFORM.—If it is desired that the bolted tank be raised a foot or so above ground level, then, as illustrated in Sheet 4925, a corrugated galvanized sheet steel ring is filled with sand, or earth topped off with 5"-6" sand, cambered in the centre. This is then covered with tarred felt, on which the tank bottom rests. Normally the mound ring is one sheet high, but this can be sunk into the ground to the height desired.

CONNECTIONS.—Special casting connections made for corrugated sheet steel tanks are sold by most large hardware merchants. These include corrugated washer castings, flange castings, and wash-out plugs.

Corrugated washer castings are available for ¾"-2" outlet pipe connections. For pipe sizes 2½"-4" corrugated flange castings are made similar to corrugated washers, except that they fit two corrugations of the sheet instead of one. They are bolted on to the tank with felt packing as an insert.

The tank wash-out plug is made primarily for fitting to mound ring type tanks. The outlet is 3" in diameter, and permits quick flushing of the tank when it is to be cleaned.

With four-ring high tanks or three-ring tanks on a platform, a 2" outlet put into the side of the tank is an advantage for filling fire-fighting containers.

COVERING.—For tanks larger than 18' diameter it is not normal to provide a galvanized sheet roof. To prevent debris and birds from entering the tank, it can be covered with a bird wire framework carrying hessian. 8" x 4" posts with ½" eye-bolts and square washers at the top are sunk into the ground. The eye-bolts carry a fencing wire spider, which in turn supports the painted or suitably treated hessian cover.

PAINTING.—Where there is any suspicion of the water containing impurities, the tank should be treated internally. The inside of tanks can be painted with boiled oil and cement, or failing this, zinc oxide paint. After weathering an external coating of paint also adds to the appearance of the tank. The practice of tarring the inside of tanks and troughing should be regarded with suspicion. Some tars contain acids which promote the corrosion of galvanized sheet. Unless local experience has definitely shown a particular tar to be strongly protective, it should not be used.

VOLUME OF TANK.— Using 8'-12' lengths of Lysaght's 8-3" corrugation Orb sheets curved to the required diameter, a comprehensive range of tanks can be built. The volume of various sizes of tanks 6' and 8' high can be readily seen from the table below, in which 9" lap of wall sheets is allowed. Common practice has been to make a selection from tanks constructed of 10' sheets.

CAPACITY OF TANK — GALLONS

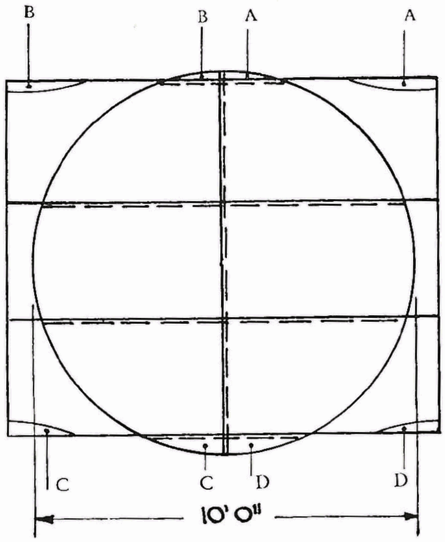
Number of sheets to the tank perimeter	SIX FEET HIGH — THREE RINGS					EIGHT FEET HIGH — FOUR RINGS				
	Length of Sheet — Feet					Length of Sheet — Feet				
	8	9	10	11	12	8	9	10	11	12
6	6,100	7,800	9,700	11,300	13,600	8,400	10,400	13,000	15,100	19,000
7	8,200	10,000	12,600	15,400	18,600	11,000	14,100	17,700	20,600	24,800
8	10,100	13,000	16,400	20,200	24,300	14,400	18,500	21,900	27,000	32,400
9	12,700	16,500	20,800	25,500	30,700	18,200	22,000	27,700	34,000	41,000
10	15,700	20,400	25,600	31,500	37,900	21,000	27,200	34,200	42,000	50,600
11	19,100	24,700	31,000	38,100	45,900	25,400	32,900	41,400	50,800	61,200
12	22,700	29,400	36,900	45,400	54,600	30,200	39,200	49,300	60,500	72,900

TANKS AND
TANKSTANDS

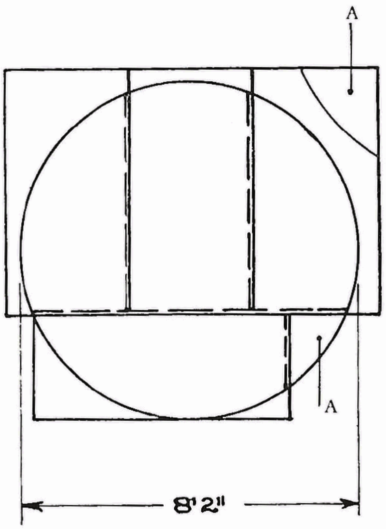
LYSAGHT'S
COUNTRY SERVICE

SHEET 4914

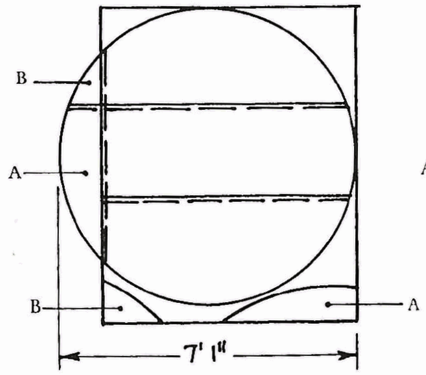
CONSTRUCTION OF TANKS — 500-3,000 GALLONS



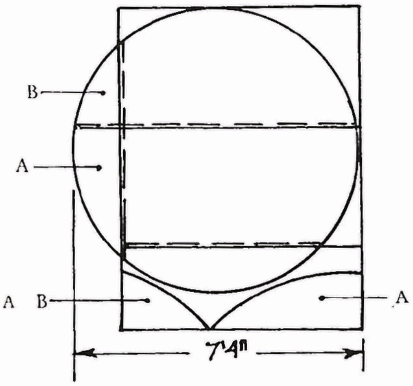
3000 GALLONS



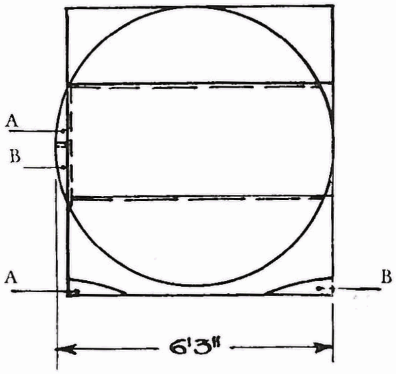
2000 GALLONS



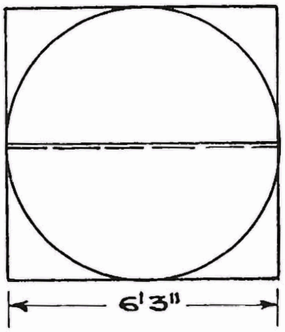
1500 GALLONS



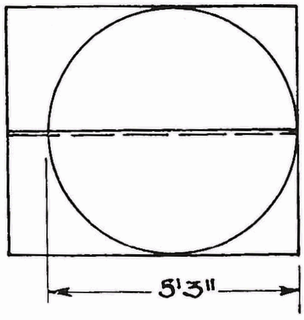
1000 GALLONS SQUAT



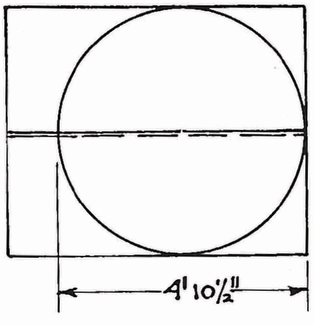
1200 GALLONS OR
800 GALLONS SQUAT



1000 GALLONS



800 GALLONS OR
600 GALLONS SQUAT



500 GALLONS

TANKS AND TANKSTANDS

LYSAGHT'S COUNTRY SERVICE

SHEET 4914

CONSTRUCTION OF TANKS — 500-3,000 GALLONS

GENERAL.— Circular tanks of Corrugated Galvanized Iron are the most efficient and economical means of storing water. Overleaf sketches show how Lysaght's Queen's Head flat sheets are joined to form tank bottoms for certain selected tanks in the range 500-3,000 gallons. It must be remembered, however, that whereas 24", 30" and 36" wide sheets are indicated for the most economical cutting, most plumbers use only 36" wide sheets; any offcuts being used for other tanks or miscellaneous sheet metal work.

WALLS.—The walls are made from Lysaght's 24-gauge 8-3" corrugations Orb sheets curved to the required diameter.

BOTTOM.—The bottom is of 24-gauge Queen's Head flat sheet seamed or riveted, as shown in the typical layouts overleaf.

TANK TOP.— Open-top tanks are preferable, but protection of drinking water generally means that the tank must be covered. The top is of 26g. Queen's Head galvanized flat sheet, and the layout is the same as for the bottom.

RIVETING.— Wall sheets are riveted together with 3/16" diameter galvanized tank rivets and washers. Holes for rivets are punched with a 3/16" diameter parallel prick punch. Sheets are lapped 4"- 6" on the vertical seams and riveted into rings with two rows of rivets. Rings are lapped one corrugation and riveted at 6"-8" centres.
If the top and/or bottom are riveted, then the galvanized flat sheets are lapped 1½", and riveted with No. 8 Tinmen's rivets at 2" centres.

SOLDERING.—All wall sheets in both horizontal and vertical joints and rivet heads are to be soldered, after riveting, with normal solder, joints to be wiped dry and free from acid.

FITTINGS.—Fittings can be purchased with special flanges to fit the corrugations of the tanks. These are recommended for tanks of large capacity.

Alternatively, the outlet connection is made from an ordinary piping socket, reinforced by a sheet metal boss, sweated to the tank. This carries the outlet cock.

A 15" manhole is made before the roof is placed on the tank, and the manhole fitted with a removable strainer and gauze. A 2" overflow close to the top is desirable.

PAINTING.—Where there is any suspicion of the water having impurities the tank should be painted internally. This can be done with boiled oil and cement, or failing this, zinc oxide paint, or any proprietary lines recommended by reputable firms.

NOTE.—When two or more tanks are connected at the bottom, so that transfer of water from one tank to another is possible, there is a possibility of rapid corrosion. As far as possible each tank should have its own outlet and water supply from the roof. If practical considerations make the connection of tanks to a common main desirable, separate water supplies should be provided for each tank. This recommendation applies with particular force to subsequent additions of a tank or replacements.

CAPACITY OF TANK — GALLONS
SQUAT OR 4ft. HIGH (4" Lap)

Length of sheet in feet	Number of sheets to the perimeter			
	1	2	3	4
6	—	250	570	1,030
7	—	350	800	1,420
8	—	470	1,060	1,880
9	—	600	1,350	2,400
10	180	740	1,680	3,000
11	220	910	2,050	3,640
12	270	1,080	2,450	4,350

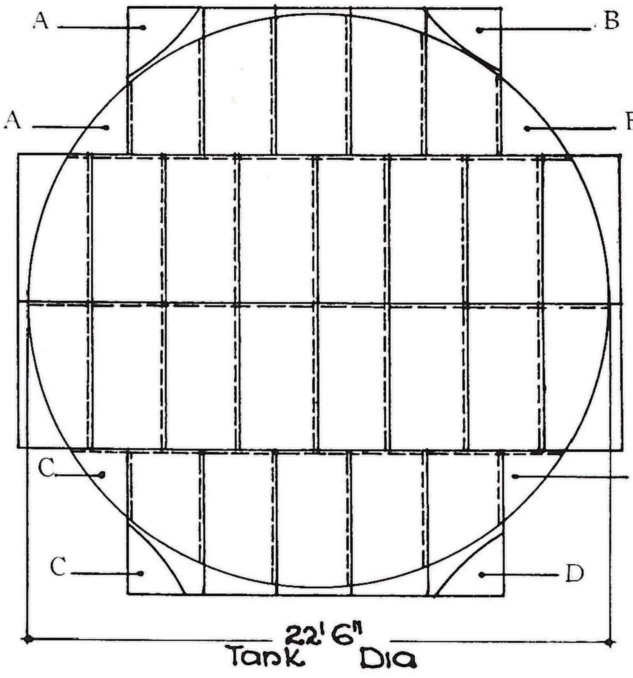
CAPACITY OF TANK — GALLONS
6ft. HIGH—THREE RINGS (4" Lap)

Length of sheet in feet	Number of sheets to the perimeter			
	1	2	3	4
6	—	380	860	1,540
7	—	530	1,200	2,130
8	—	700	1,580	2,820
9	—	900	2,030	3,600
10	280	1,120	2,520	4,480
11	340	1,300	3,070	5,460
12	400	1,600	3,670	6,530

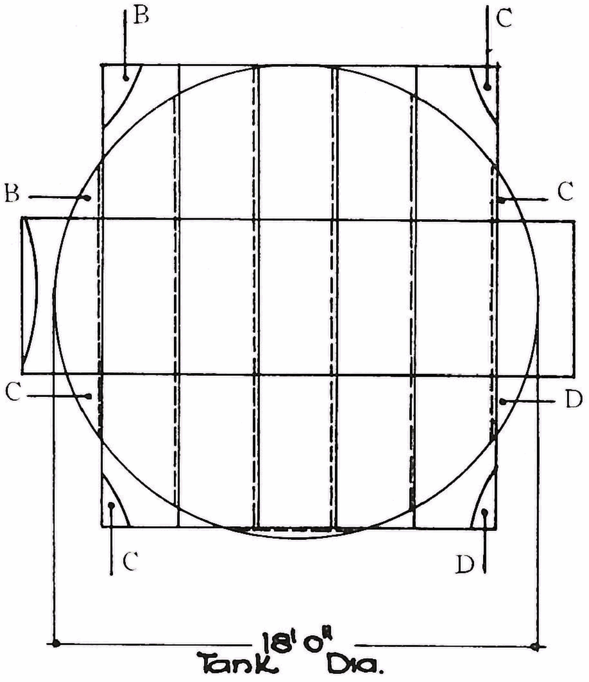
CORRUGATED GALVANIZED IRON TANKS IN COMMON USE

Capacity of Tank Gallons	Height	Diameter	Walls — 8-3" Corrugations 24g. Orb Sheets	Queen's Head Flat Sheets Bottom 24g. — Top 26g.
500	6' 0"	4' 0"	3—7 ft. and 3—6 ft.	1—6' x 36"
500 squat	4' 0"	4' 11"	4—8 ft.	2—6' x 30"
600	6' 0"	4' 4"	6—7 ft.	1—6' x 36"
600 squat	4' 0"	5' 3"	2—9 ft. and 2—8 ft.	1—6' x 36" and 1—6' x 30"
800	6' 0"	5' 0"	6—8 ft.	1—6' x 36" and 1—6' x 30"
800 squat	4' 0"	6' 3"	4-10 ft.	1—6' x 36" and 1—6' x 30"
1000 small	6' 0"	5' 7"	6—9 ft.	2—6' x 36"
1000 full	6' 0"	5' 11"	3-10 ft. and 3—9 ft.	2—6' x 36"
1000 squat	4' 0"	6' 11"	4-11 ft.	2—6' x 36" and 1—6' x 24"
1000 squat	4' 0"	7' 4"	6—8 ft.	2—6' x 36" and 1—6' x 24"
1200	6' 0"	6' 3"	6-10 ft.	1—6' x 30" and 2—6' x 24"
1500	6' 0"	7' 1"	6—8 ft. and 3—7 ft.	1—6' x 36" and 2—6' x 30"
2000	6' 0"	8' 3"	9—9 ft.	3—6' x 36" and 1—6' x 30"
3000	6' 0"	10' 0"	3—9 ft. and 9—8 ft.	6—6' x 36"

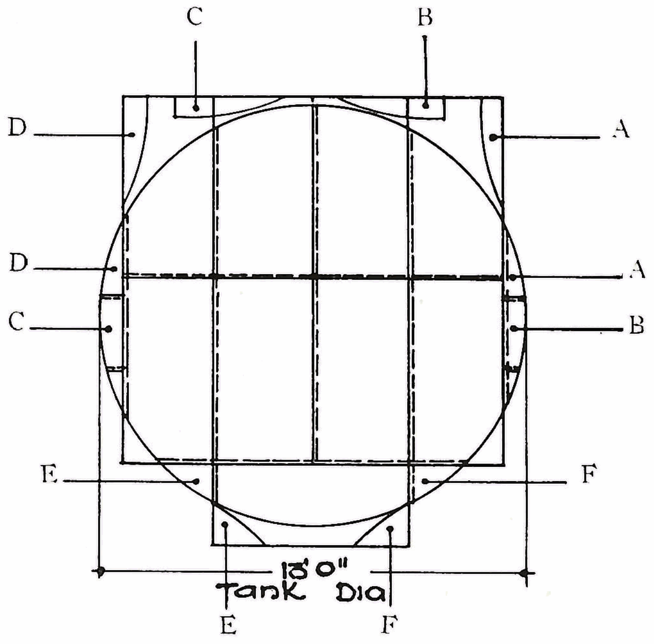
CONSTRUCTION OF TANKS — 4,000-15,000 GALLONS



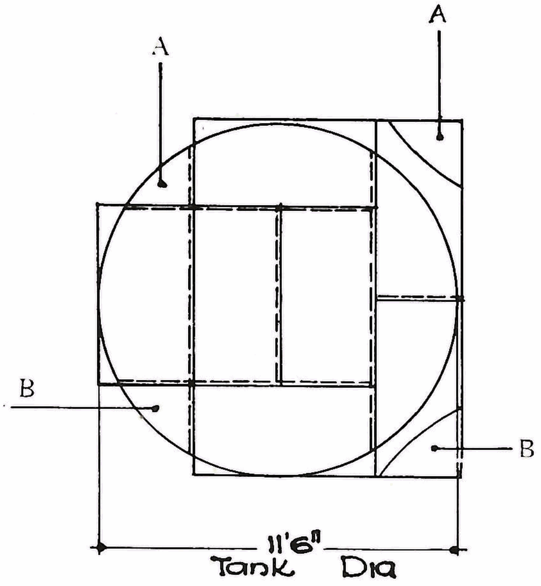
15000 GALLONS



10000 GALLONS



5000 GALLONS



4000 GALLONS

TANKS AND
TANKSTANDS

LYSAGHT'S
COUNTRY SERVICE

SHEET 4915

CONSTRUCTION OF TANKS — 4,000-15,000 GALLONS

GENERAL.– Circular tanks of Corrugated Galvanized Iron are the most efficient and economical means of storing water.

They are ideally suited for stock watering; the majority of tanks for this purpose falling in the range 4,000-15,000 gallons as described in this sheet. Sheets are generally joined by riveting and soldering, particularly if the local plumber makes the tank from his stock sheets.

Many tanks, however, are purchased in the prefabricated condition from city manufacturers; such tanks above 5,000 gallons are generally of bolted construction.

WALLS.—The walls are of Lysaght's 8-3" corrugations Orb sheet, curved to the required diameter. 24-gauge is suitable up to 10,000 gallons capacity, and 22-gauge to 20,000 gallons. Manufacturers of prefabricated tanks, however, generally make all tanks in this range 22-gauge.

If of riveted construction, the walls are riveted with 3/16" diameter x $\frac{3}{4}$" galvanized tank rivets and washers.

The sheets are side-lapped 6"-9", depending on the diameter, and riveted with two rows of washers. Rings are lapped one corrugation and riveted at 6"-8" centres.

All joins and rivet heads are soldered with normal solder.

If of bolted construction, the wall joints are packed with felt strips soaked in oil, red lead, or similar preparation, and bolted together with 9/32" diameter x $\frac{5}{8}$" (or $\frac{3}{4}$") galvanized bolts with nuts and washers. Two rows of bolts are used on vertical joints, and one row at $2\frac{1}{2}$" centres on horizontal joints.

BOTTOM.—The bottom is made of Queen's Head Brand flat sheet of the same gauge as the bottom ring of the tank, i.e., in the above range, 22g. or 24g. Sheets are lapped $1\frac{1}{2}$" and riveted with No. 8 or 9 Tinmen's rivets, spaced at 2" centres, the seam then being soldered.

Overleaf are shown typical layouts of 6' x 3' sheets for joining and cutting tank bottoms for representative tanks in the range considered. 6' x 3' are indicated, as most plumbers have stocks of this size. Lysaght's manufacture 8' x 3' sheets, and this size is more economical in riveting and soldering for the larger size tanks.

In the case of both bolted and riveted tanks the edge of the bottom sheet is to be flanged out, turned up and over the lip of the wall sheet, flattened, and soldered.

TANK TOP.—Coverings are seldom used in tanks above 18' diameter. If a cover is required over this size it can either be of the trussed steel type, or if required only to keep leaves, birds, and debris out, then hessian laid on suspended bird wire will suffice.

Under 18' diameter the roof is made from 26g. flat Queen's Head sheets, joined and cut in a similar manner to the bottom, as illustrated overleaf. A 15" manhole is made before the roof is placed on the tank, and the manhole fitted with a removable strainer and gauze.

FITTINGS.—Special casting connections made for corrugated sheet steel tanks are sold by most large hardware merchants. These include corrugated washer castings, flange castings, and wash-out plugs.

For $\frac{3}{4}$"-2" outlet pipe connections corrugated washer castings are available. For pipe sizes $2\frac{1}{2}$"-4" corrugated flange castings are made similar to corrugated washers except that they fit two corrugations of the sheet instead of one. They are bolted on to the tank with felt packing as an insert. Alternatively, for sizes $\frac{3}{4}$"-1", the outlet connection is made from an ordinary piping socket reinforced by a sheet metal boss sweated to the tank. This carries the outlet pipe and cock.

The tank wash-out plug is made primarily for fitting to mound ring type tanks. The outlet is 3" in diameter, and permits quick flushing of the tank when it is to be cleaned.

A 2" overflow is desirable close to the top.

PAINTING.—Where there is any suspicion of the water having impurities, the tank should be painted internally. This can be done with boiled oil and cement, and failing this, zinc oxide paint or any proprietary lines recommended by reputable firms.

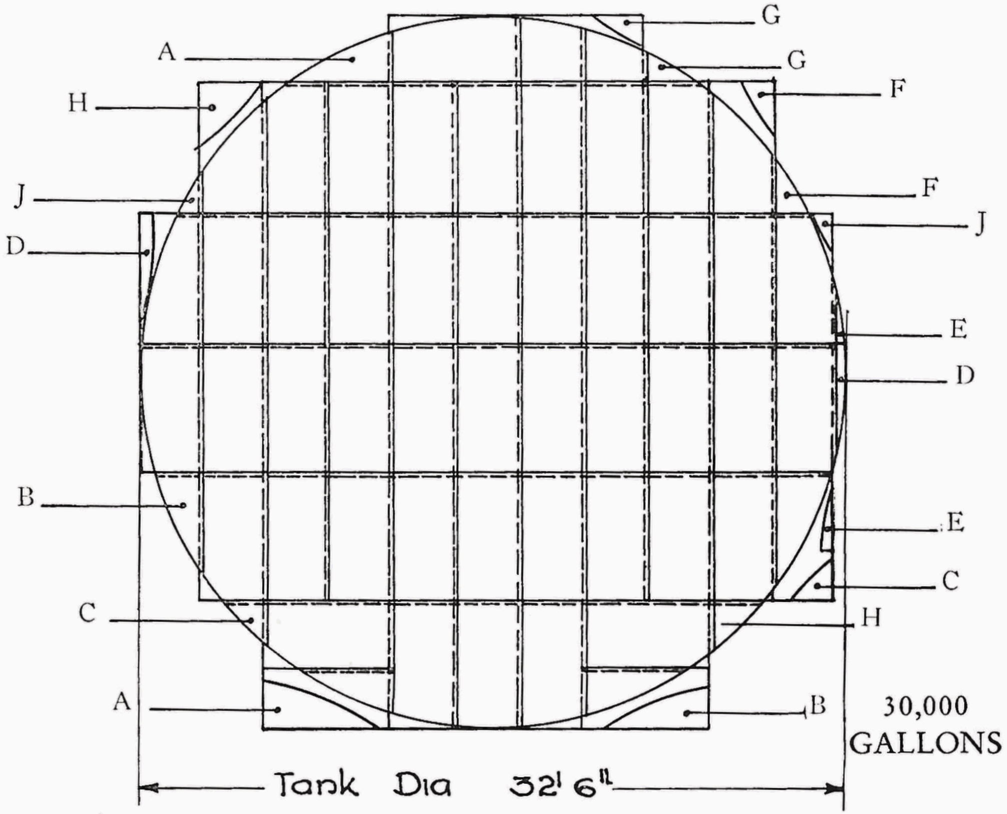
NOTE.—When two or more tanks are connected together at the bottom, so that transfer of water from one tank to another is possible, there is always the chance of rapid corrosion. As far as possible each tank should have its own outlet and water supply from the roof. If practical considerations make the connection of tanks to a common main desirable, separate water supplies should be provided to each tank. This recommendation applies with particular force to subsequent additions to a tank installation, or replacement of a tank which has already corroded quickly.

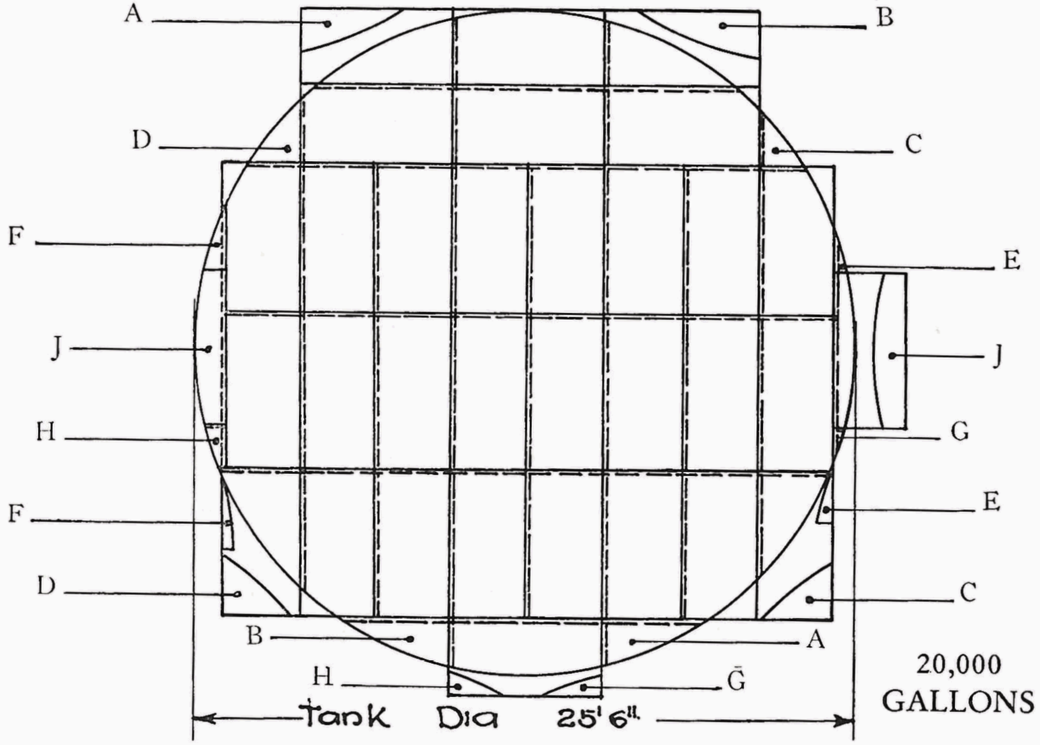
CAPACITY OF TANK — GALLONS

Allowing side laps of 4" to 5,000 gallons; 6" for 5,000-10,000 gallons; 9" lap over 10,000 gallons.

Number of Sheets to Perimeter	HEIGHT 4' — TWO RINGS					HEIGHT 6' — THREE RINGS					HEIGHT 8' — FOUR RINGS				
	Length of Sheet—feet					Length of Sheet—feet					Length of Sheet—feet				
	8	9	10	11	12	8	9	10	11	12	8	9	10	11	12
4	1,900	2,400	3,000	3,600	4,300	2,800	3,600	4,500	5,300	6,300	—	—	5,700	7,000	8,400
5	3,000	3,700	4,600	5,500	6,600	4,400	5,400	6,700	8,200	9,900	5,600	7,200	9,000	10,500	12,600
6	4,200	5,200	6,500	7,900	9,500	6,100	7,800	9,700	11,300	13,600	8,100	9,800	12,300	15,100	18,200
7	5,500	7,000	8,800	10,300	12,400	8,200	10,000	12,500	15,400	18,600	10,300	13,300	16,700	20,600	24,800
8	7,200	9,200	10,900	13,400	16,200	10,000	13,000	16,400	20,100	24,300	13,400	17,400	21,900	26,900	32,400

CONSTRUCTION OF TANKS OVER 20,000 GALLONS CAPACITY





CONSTRUCTION OF TANKS OVER 20,000 GALLONS CAPACITY

GENERAL.—Tanks of 20,000 gallons and over are most commonly used on stations for holding large quantities of water for stock. Circular tanks of corrugated galvanized steel sheet are the most efficient and economical means of storing water for this purpose.

Various methods of construction exist, varying from the riveted and soldered construction described in Sheet 4911, the bolted construction as described in Sheet 4913, to the construction of very large tanks with concrete bottoms, or even impervious clay bottoms.

Whether the sheets are bolted or riveted is immaterial to tanks with galvanized bottoms, which in all cases are soldered to the tank shells. Overleaf are illustrated methods of joining 6' x 3' sheets to form bottoms for tanks of 20,000 and 30,000 gallons capacity.

WALLS.—The walls are made from Lysaght's 8-3" corrugations Orb sheets curved to the diameter required. A 10' sheet is the most common length sheet in use, though the more economical 11' and 12' lengths are gaining increased popularity.

The thickness of the sheet is dependent on the height of the tank, the diameter of the tank, and the ring of the tank in which the sheet is located. Though theoretically the sheets in the top ring can be a lighter gauge than those in the lower rings, it is the usual practice to use the same gauge sheet throughout the tank.

A very handy rule is that if:—

D = diameter of the tank in feet
h = depth of tank at bottom of ring considered in feet
t = thickness of tank sheet in inches;

then $t = \frac{h\,D}{5000}$

Example: 30,000-gallon tank—

Diameter is 32' 6"
Depth at bottom 6'

Thickness $= \frac{32.5 \times 6}{5000} = .039$"

Therefore, use 20-gauge, which is .039".

Tanks have been made six rings, or 12' high, but this necessitates heavy bottom ring sheets. In general, large tanks are three rings, or 6' high, or four rings, that is, 8' high.

It must be remembered that Orb iron for tanks is manufactured—

8-3" corrugations in 18 to 24g. inclusive
5" corrugations in 14 to 20g. inclusive

therefore tanks requiring a gauge of sheet heavier than 18g. must be manufactured in 5" corrugations sheet. This corrugation sheet is particularly suited for large bolted tanks with concrete bottoms. No attempt is made to set out a list of such tanks here, and each particular tank should be individually designed. The table herewith, however, gives the limit of height and diameter for each gauge.

GAUGE OF WALL SHEETS

MAXIMUM DIAMETERS ALLOWABLE

Height Feet	Gauge					
	24	22	20	18	16	14
4	30	38	48	60	75	90
6	20	25	32	40	50	60
8	15	18	24	30	36	42

Tanks of 18 gauge and heavier are bolted types.

BOTTOM.—Up to about 40 feet diameter tank bottoms are made of galvanized flat sheet laid on an earth-filled ring. The gauge of sheet used is the same gauge as in the lower ring of the tank. Sheets are lapped 1½" and riveted with Tinmen's rivets, the size depending on the thickness of the bottom sheet.

BOLTED JOINTS.—Where tanks are of bolted construction, the wall joints are packed with felt strips soaked in oil-red lead, or similar preparations, and bolted together with 9/32" diameter or ¼" diameter bolts, ⅝" or ¾" in length.

Sheets are lapped 6"-12", dependent on the size of the tank.

CURB RINGS.—It is desirable that the top of large tanks be reinforced with a light angle iron curb ring, 1" x 1" x ⅛" minimum. This should be preferably galvanized, but, in any case, painted with a preserving paint before erection.

TANK PLATFORM.—Large tanks either rest flat on the ground or on an earth mound enclosed in a corrugated galvanized ring as described in Sheet 4923.

FITTINGS.—Special casting connections, made for corrugated sheet steel tanks, are sold by large hardware merchants.

These include corrugated washer castings, flange castings, and wash-out plugs.

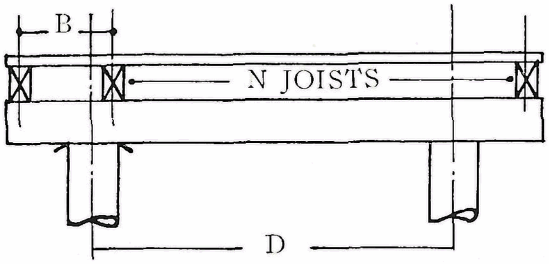
For ¾"-2" outlet pipe connections corrugated washer castings are available. For pipe sizes 2½"-4" corrugated flange castings are made similar to corrugated washers, except that they fit two corrugations of the sheet instead of one. They are bolted on to the tank with felt packing as an insert. The tank wash-out plug is made primarily for fitting to mound ring type tanks. The outlet is 3" in diameter and permits quick flushing of the tank when it is to be cleaned.

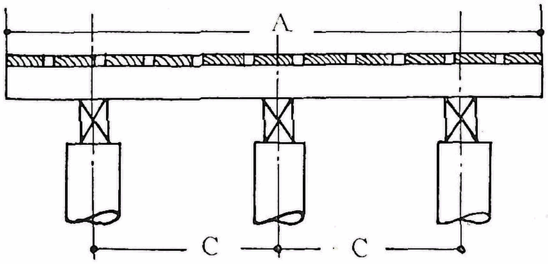
PAINTING.—Where there is any suspicion of the water having impurities, the tank should be painted internally. This can be done with boiled oil and cement. Otherwise zinc oxide paint or any proprietary line recommended by any reputable firm can be used.

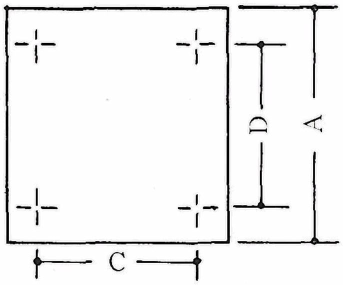
CAPACITY OF TANK — GALLONS

Number of Sheets to the Tank Perimeter	SIX FEET HIGH — THREE RINGS					EIGHT FEET HIGH — FOUR RINGS				
	Length of Sheet — Feet					Length of Sheet — Feet				
	8	9	10	11	12	8	9	10	11	12
9	12,700	16,500	20,800	25,500	30,700	18,200	22,000	27,700	34,000	41,000
10	15,700	20,400	25,600	31,500	37,900	21,000	27,200	34,200	42,000	50,600
11	19,100	24,700	31,000	38,100	45,900	25,400	32,900	41,400	50,800	61,200
12	22,700	29,400	36,900	45,400	54,600	30,200	39,200	49,300	60,500	72,900

TANKSTANDS — GENERAL







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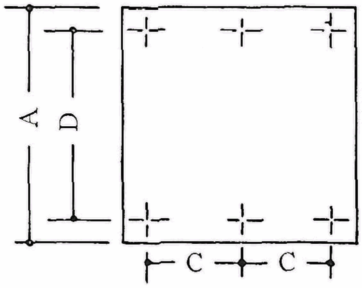

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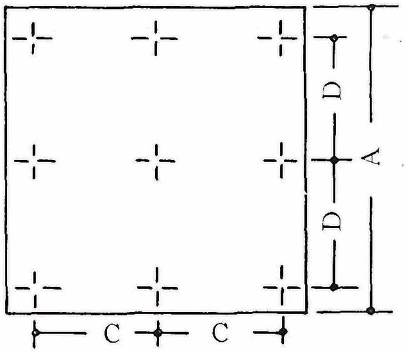
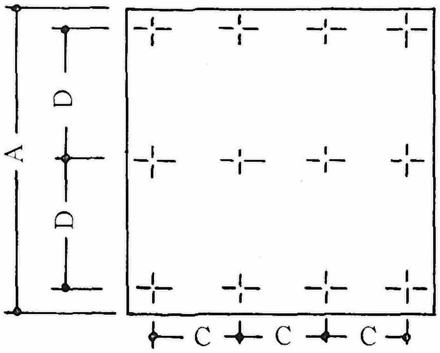
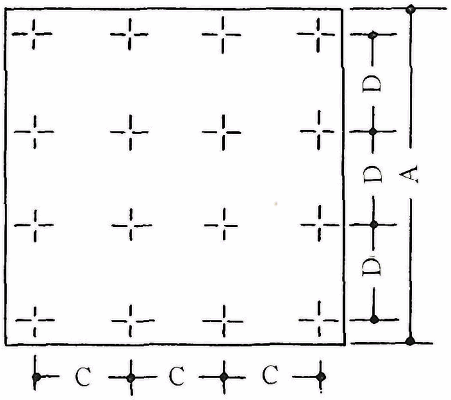


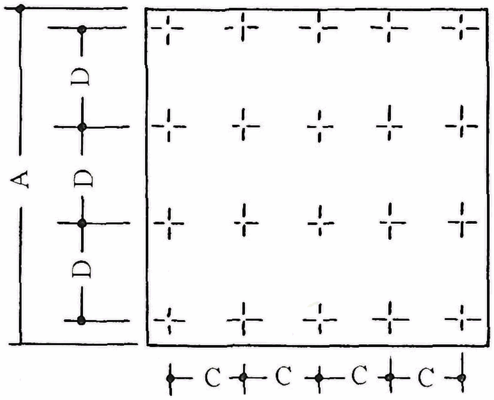
9 PIER



12 PIER



16 PIER



20 PIER

TANKS AND TANKSTANDS

LYSAGHT'S COUNTRY SERVICE

SHEET 4921

TANKSTANDS — GENERAL

GENERAL.—The diagrams overleaf show the various ways in which piers can be grouped to make a tankstand. They are dimensioned with letters as a key to the table below, which gives suitable timber sizes and spacings for tankstands up to 5,000 gallons.

Later Sheets 4922, 4923, 4924 give further details of the actual construction of particular stands. In these pages a stand is not regarded as "an elevated tankstand" till it exceeds 10' in height. Elevated tankstands are dealt with in Sheets 4932, 4933, 4934.

FOUNDATIONS.—The ground in country areas has a wide range of bearing possibilities, but in order to be on the safe side assume a loading of 1-2 tons per square foot. The number of piers to use on a stand is influenced by the manner in which the piers distribute the load to the ground. By resting these on suitable sole plates or concrete footings, each pier can carry 1-4 tons.

PIERS.—The piers can be of round bush timber, brick, or any improvisation such as railway lines, railway sleepers, etc.

Number of Piers for Various Bearing Values

Volume of Tank	Weight of Full Tank plus Platform	Bearing Value		
		1 Ton per pier	2 Tons per pier	3 Tons per pier
1,000	5 tons	6	4	4
1,500	7 "	6	4	4
2,000	9½ "	9	6	4
3,000	14 "	16	9	6
4,000	18½ "	20	9	6
5,000	23 "	24	12	9
10,000	45½ "	—	24	16

Three tons per pier is only allowable when piers have large sole plates or are potted in concrete.

General practice is to use:—

- 4 piers up to 1,200 gallons
- 6 piers 1,200-2,000 gallons
- 9 piers 3,000 gallons
- 16 piers 3,000-5,000 gallons
- 24 piers at 10,000 gallons.

PLATFORM.—The width or length of the platform is some 3"-5" greater than the mean diameter of the tank, and the dimensions given below are representative. The decking used is generally 1"-1¼" nominal thickness, the nominal width 3"-7", whichever is available, with a spacing between boards ¾"-1¼".

JOISTS.—With 1"-1¼" decking, joists can be spaced:—

1" —maximum 24" apart for 6' high tanks.

1¼"—maximum 30" apart for 6' high tanks.

Considerations of joist size, that is, that the timber be one of common usage, generally dictate spacing 18"-24".

BEARERS.—The bearer size is governed both by the joist spacing and the distance between piers, and the table below gives a suggested list of size for spacings considered.

NOTE.—For tanks below 4' 0" diameter, joists can be dispensed with and 1¼"-1½" decking used, resting directly on bearers, which in turn are carried by piers.

SIZE OF TIMBERS

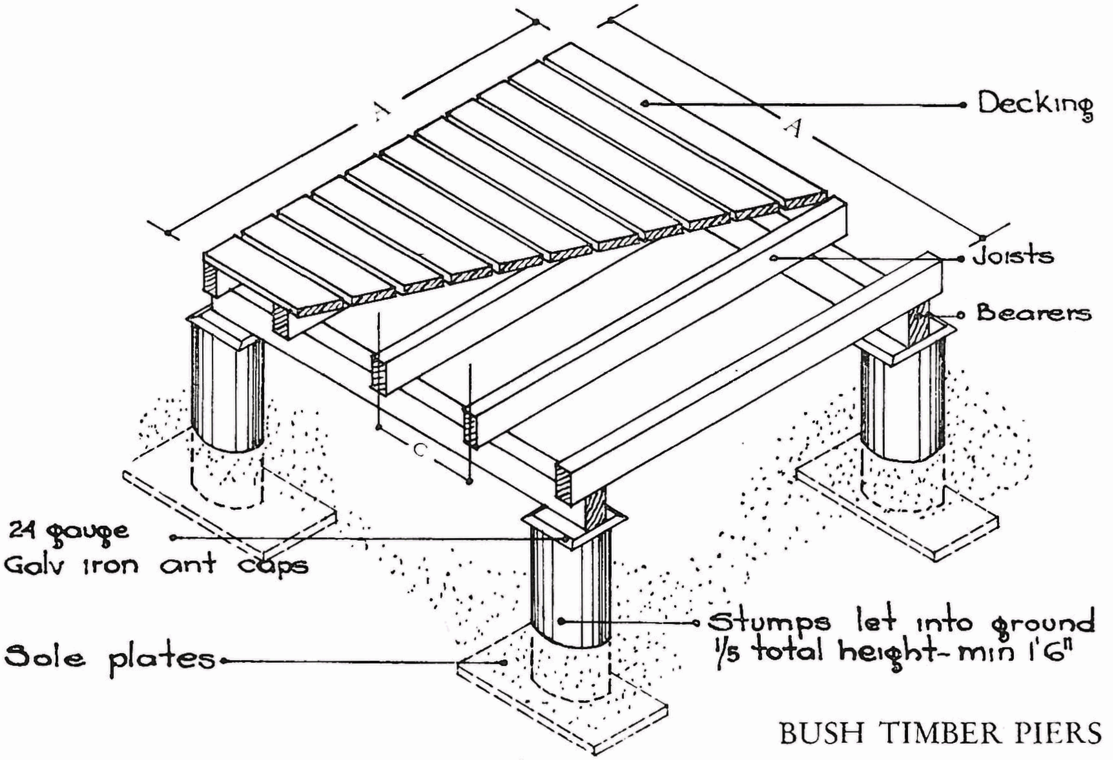
Capacity of Tank	Dia. of Tank	Side of Square Platform "A"	Piers		Joists			Bearers		
			Number	Distance "D"	Number "N"	Size	Spacing "B"	Number	Size	Spacing "C"
600	4' 4"	4' 8"	4	3' 6"	4	4" x 3"	18"	2	4" x 3"	3' 6"
600 squat	5' 3"	5' 6"	4	4' 0"	4	4" x 3"	21"	2	5" x 3"	4' 0"
800	5' 0"	5' 3"	4	3' 6"	4	4" x 3"	20½"	2	5" x 3"	3' 6"
800 squat	6' 3"	6' 6"	4	4' 0"	5	4" x 2"	19"	2	5" x 3"	4' 0"
1,000 small	5' 7"	5' 11"	4	4' 0"	4	5" x 3"	22½"	2	6" x 3"	4' 0"
1,000 full	5' 11"	6' 2"	4	4' 0"	4	5" x 3"	23½"	2	6" x 3"	4' 0"
1,000 squat	7' 4"	7' 7"	4	5' 0"	5	5" x 2"	22"	2	6" x 3"	5' 0"
1,200	6' 3"	6' 6"	4	4' 0"	4	5" x 2"	18½"	2	6" x 3"	4' 0"
			6	5' 0"	4	4" x 2"	18½"	3	6" x 3"	2' 6"
1,500	7' 1"	7' 4"	4	4' 6"	5	6" x 2"	20½"	2	6" x 4"	4' 6"
			6	5' 0"	5	4" x 2"	20½"	3	6" x 3"	2' 6"
2,000	8' 3"	8' 6"	6	7' 0"	6	4" x 3"	20"	3	8" x 4"	3' 6"
			9	3' 6"	6	4" x 3"	20"	3	5" x 3"	3' 6"
			12	3' 6"	6	4" x 2"	20"	4	4" x 3"	2' 4"
3,000	10' 0"	10' 3"	9	4' 0"	7	5" x 3"	20"	3	5" x 3"	4' 0"
			12	4' 0"	7	4" x 2"	20"	4	4" x 3"	2' 8"
4,000	11' 6"	11' 9"	12	4' 6"	8	4" x 2"	20"	4	6" x 3"	3' 0"
			16	3' 0"	8	4" x 2"	20"	4	5" x 3"	3' 0"
5,000	13' 0"	13' 3"	12	5' 0"	9	4" x 3"	19½"	3	6" x 4"	3' 4"
			16	3' 4"	9	4" x 3"	19½"	4	5" x 3"	3' 4"
			20	3' 4"	9	4" x 2"	19½"	5	4" x 3"	2' 6"

TANKS AND TANKSTANDS

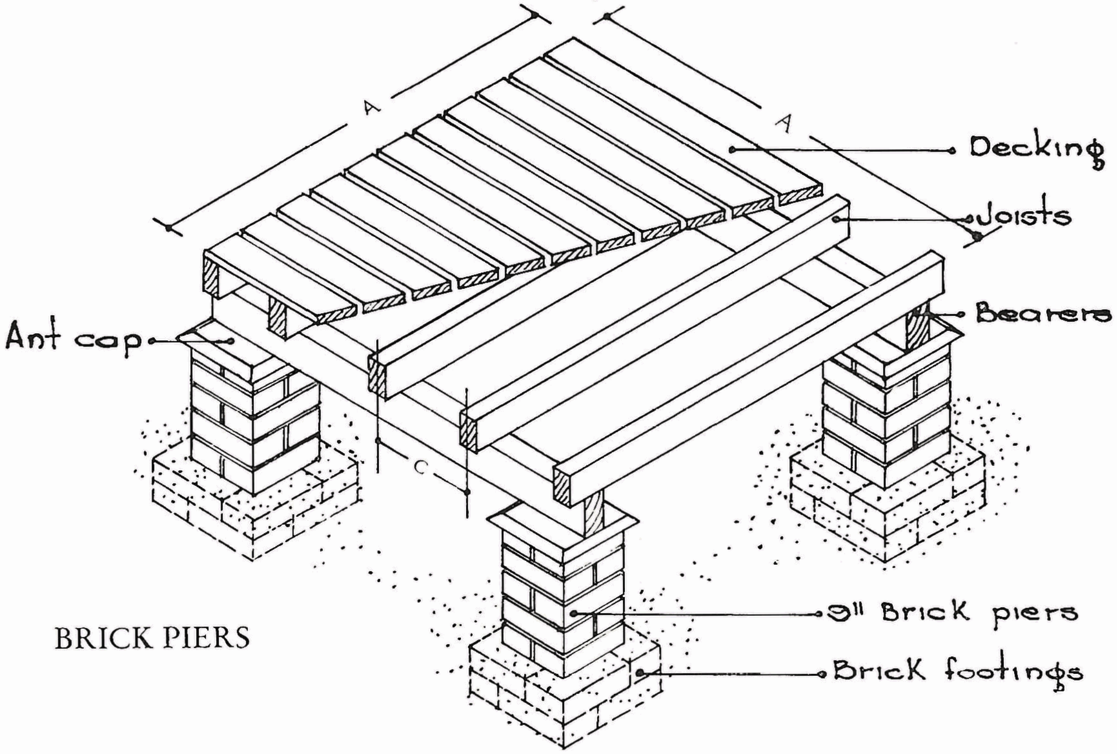
LYSAGHT'S COUNTRY SERVICE

SHEET 4922

TANKSTANDS — 500-1,500 GALLONS TANK CAPACITY



BUSH TIMBER PIERS



BRICK PIERS

TANKS AND
TANKSTANDS

LYSAGHT'S
COUNTRY SERVICE

SHEET 4922

TANKSTANDS — 500-1,500 GALLONS TANK CAPACITY

GENERAL.—The sketches overleaf show typical tankstand construction with timber or brick piers, for tanks up to 1,500 gallons capacity. This sheet covers the normal range of tanks associated with country household use.

PIERS.—The stand as illustrated is of four-pier construction. The piers can be of round bush timber, 9" square brickwork, or any improvisation such as railway sleepers, railway lines, etc.

With round hardwood bush stumps 6"-8" diameter is sufficient. These are let into the ground 18", or 1/5th of the total height of the stump, whichever is the greater.

Stumps are to have any bark stripped off, and thoroughly coated with creosote or other white ant deterrent mixture before erection. The bottoms are to be sawn true before placing on sole plates.

FOUNDATIONS.—The ground in country areas has a wide range of bearing possibilities. In order to be on the safe side, assume 1 ton/sq. foot for ordinary soil. For hard ground, 2 tons/sq. foot can be allowed.

For a 1,000 gallon tank the total load of the full tank and stand is about 5 tons, or $1\frac{1}{4}$ tons per pier. If 1 ton/sq. foot is allowed for the ground, $1\frac{1}{4}$ sq. foot of area is required under each pier to take the load. This is done by the provision of a sole plate, in this case a 12" x 3" $1\frac{1}{4}$' long, or 2' of old 10" x 4" railway sleeper.

Alternatively the posts can be potted in concrete. In hard ground no sole plates are required for tanks up to 1,500 gallons.

CAPPING.—Over each stump or pier is fixed a 24g. Galvanized Iron or Zincanneal white ant cap with edges turned down $1\frac{1}{2}$" on all sides at an angle of 45°, and all corners crimped.

BEARERS.– Bearers are to be a minimum of 4" x 3" hardwood spiked with 2-4" nails skew nailed to each stump. Sizes of bearers are given in the table below.

JOISTS.—Joists are to be a minimum of 4" x 2" hardwood, double nailed with 2-3" nails at each bearer.

DECKING.—Decking is to be 3" x $1\frac{1}{4}$" or whatever width is available up to 6" of dry hardwood laid with a $\frac{3}{4}$"-1" space between pieces. Each plank to be double nailed with 2-2" nails to each joist, the whole to finish plumb and level.

NOTE.—Care should be taken to select timber with a low moisture content and no sap present, especially the decking, as the presence of sap may set up a chemical reaction on the galvanized bottom of the tank and possibly lead to corrosion and subsequent leaks.

BRICKWORK.—If brick piers are used, 14" square footings are sufficient up to 1,000 gallons. Over this and up to 1,500 gallons use 18" square footings. In either case it is advisable to build the brick piers in cement mortar.

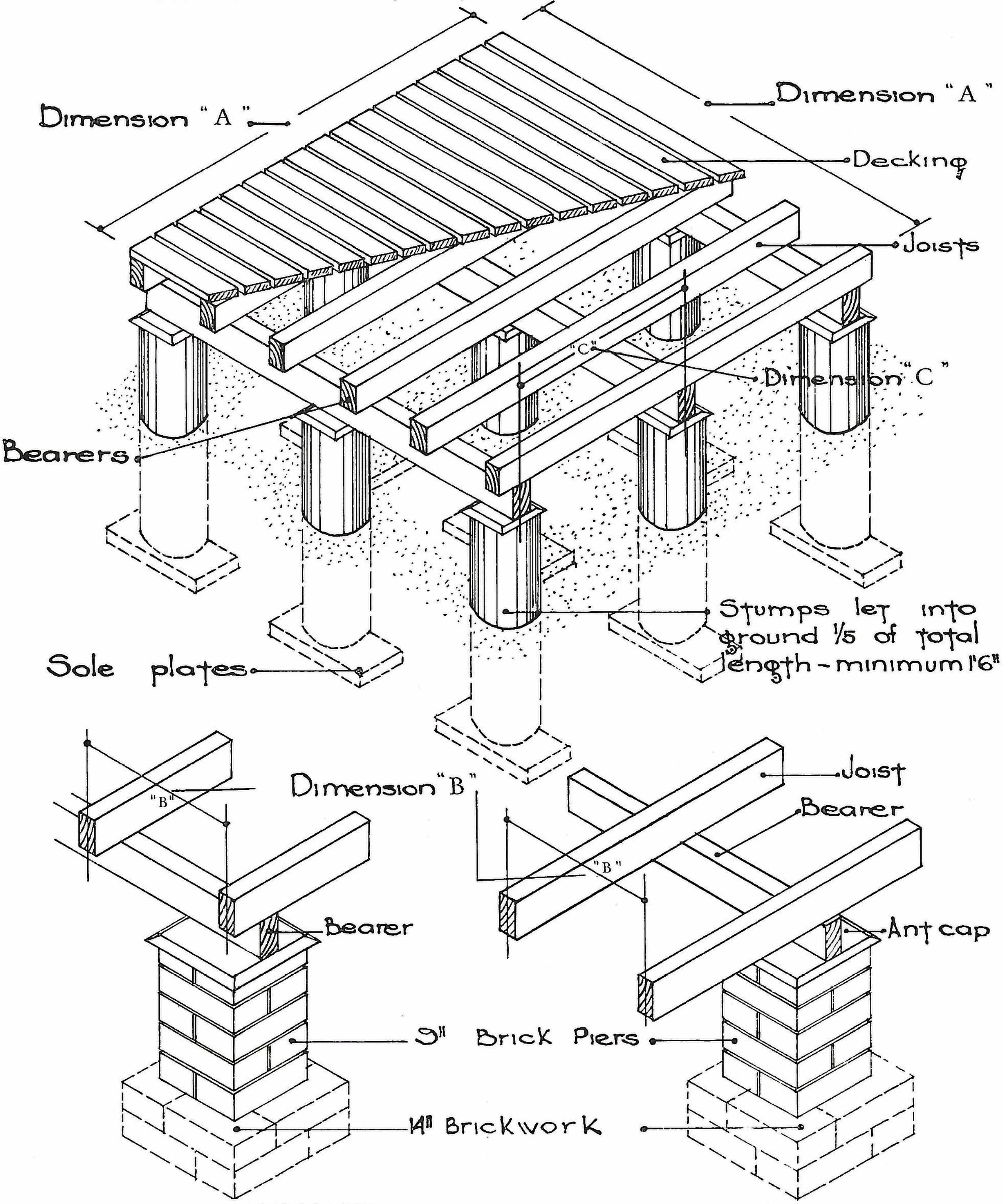
TANK CAPACITIES AND TIMBER SIZES

Capacity of Tank	Type	Diameter of Tank	Side of Square Platform "A"	Distance between Piers "C" or "D"	Joists		Bearers	Sole Plates 1 ton/sq. ft.
					Size	Spacing		
500	Standard	4' 0"	4' 3"	3' 10"	4" x 2"	11"	4" x 3"	Not necessary
500	Squat	4' 11"	5' 2"	4' 6"	4" x 2"	15"	4" x 3"	" "
600	Standard	4' 4"	4' 8"	3' 9"	4" x 2"	13"	4" x 3"	" "
600	Squat	5' 3"	5' 6"	4' 9"	4" x 2"	$15\frac{1}{2}$"	4" x 3"	" "
800	Standard	5' 0"	5' 3"	4' 6"	5" x 2"	15"	5" x 3"	10" x 2" x 12" long
800	Squat	6' 3"	6' 6"	5' 9"	5" x 2"	$18\frac{1}{2}$"	5" x 3"	10" x 2" x 12" long
1,000	Small	5' 7"	5' 11"	5' 0"	5" x 3"	$16\frac{1}{2}$"	6" x 3"	12" x 3" x 15" long
1,000	Full	5' 11"	6' 2"	5' 6"	5" x 3"	$14\frac{1}{2}$"	6" x 3"	12" x 3" x 15" long
1,000	Squat	7' 4"	7' 7"	6' 9"	5" x 3"	$21\frac{1}{2}$"	6" x 3"	12" x 3" x 15" long
1,200	Standard	6' 3"	6' 6"	5' 9"	5" x 3"	$18\frac{1}{2}$"	6" x 3"	12" x 3" x 18" long
1,500	Standard	7' 1"	7' 4"	6' 6"	5" x 3"	21"	6" x 4"	12" x 3" x 18" long

LIST OF QUANTITIES

Item	500 Standard	500 Squat	600 Standard	600 Squat	800 Standard	800 Squat	1,000 Small	1,000 Large	1,000 Squat	1,200 Standard	1,500 Standard
6" dia. Stumps	4	4	4	4	4	4	4	4	4	4	4
Galv. Sheet Ant Caps	4	4	4	4	4	4	4	4	4	4	4
Bearers, 2 off 4" x 3"	17	21	19	22	—	—	—	—	—	—	—
(linear feet) 5" x 3"	—	—	—	—	21	26	—	—	—	—	—
6" x 3"	—	—	—	—	—	—	24	25	31	26	—
6" x 4"	—	—	—	—	—	—	—	—	—	—	30
Joists, 5 off 4" x 2"	22	26	23	28	—	—	—	—	—	—	—
(linear feet) 5" x 2"	—	—	—	—	27	33	—	—	—	—	—
5" x 3"	—	—	—	—	—	—	30	31	38	33	37
Decking (lin. ft.) 4" x 1"	43	65	50	72	71	104	84	93	136	104	135
Sole Plates 10" x 2" x 12"	—	—	—	—	4	4	—	—	—	—	—
12" x 3" x 15"	—	—	—	—	—	—	4	4	4	—	—
12" x 3" x 18"	—	—	—	—	—	—	—	—	—	4	4

TANKSTANDS — 1,200-3,000 GALLONS TANK CAPACITY



ALTERNATIVE DETAILS SHOWING BRICK PIERS

TANKS AND TANKSTANDS

LYSAGHT'S COUNTRY SERVICE

SHEET 4923

TANKSTANDS — 1,200-3,000 GALLONS TANK CAPACITY

GENERAL.—The sketches overleaf show typical nine-pier tankstands constructed with bush timber posts or brickwork. The nine-pier tankstand constructed with bush timber posts or brickwork is generally used for 1,200-gallon tanks in very soft soil, and up to 3,000 gallons capacity in relatively hard soils.

PIERS.—As illustrated, the piers can be 6"-8" diameter bush stumps or 9" brickwork. A number of improvisations, such as railway lines, railway sleepers, etc., can also be used. Round hardwood stumps are let into the ground 18" or 1/5th of the total height of the stump, whichever is the greater. Stumps are to have any bark stripped off, and to be thoroughly coated with creosote or other white ant deterrent mixture before erection. The bottom of the stumps are to be sawn true before placing on sole plates.

FOUNDATIONS.—The ground in country areas has a wide range of bearing possibilities. In order to be on the safe side, assume 1 ton/sq. foot for ordinary soils. For hard ground 2 tons/sq. foot can be allowed.

For a 2,000-gallon tank the total load of the full tank and stand is about 9$\frac{1}{2}$ tons, or approximately 1 ton per pier for a nine-pier stand. If 1 ton/sq. foot is allowed for the ground, then a sole plate must be provided under each pier to provide 1 sq. foot of area. Accordingly 15" long lengths of 10" x 2" sole plates are used. A suitable sole plate is a piece of old railway sleeper.

Alternatively the posts can be potted in concrete. In hard ground no sole plates are required for 1,200-1,500 gallon tanks.

CAPPING.—Over each stump or pier is fixed a 24g. galvanized or Zincanneal white ant cap with edges turned down 1$\frac{1}{2}$" on all sides at an angle of 45° — all corners to be crimped.

BEARERS.—Bearers are to be a minimum of 4" x 3" hardwood spiked with 2-3" nails skew nailed to each stump. Sizes of bearers are given in the table below.

JOISTS.—Joists are to be a minimum of 4" x 2" hardwood double nailed with 2-3" nails at each bearer.

DECKING.—Decking is to be 1$\frac{1}{4}$" or 1" dry hardwood, preferably 4" wide, though any width up to 7" is suitable. This decking to be laid with a $\frac{3}{4}$"-1" space between pieces. Each plank to be double nailed with 2-2" nails to each joist, the whole to finish plumb and level.

NOTE.—Care should be taken to select timber with a low moisture content and no sap present, especially the decking, as the presence of sap may set up a chemical reaction on the galvanized bottom of the tank and possibly lead to corrosion and subsequent leaks.

BRICKWORK.—If brick piers are used, 14" square footings are sufficient up to 2,000 gallons. For 3,000 gallons use 18" square footings. In either case it is advisable to build the brick piers in cement mortar.

TANK CAPACITIES AND TIMBER SIZES

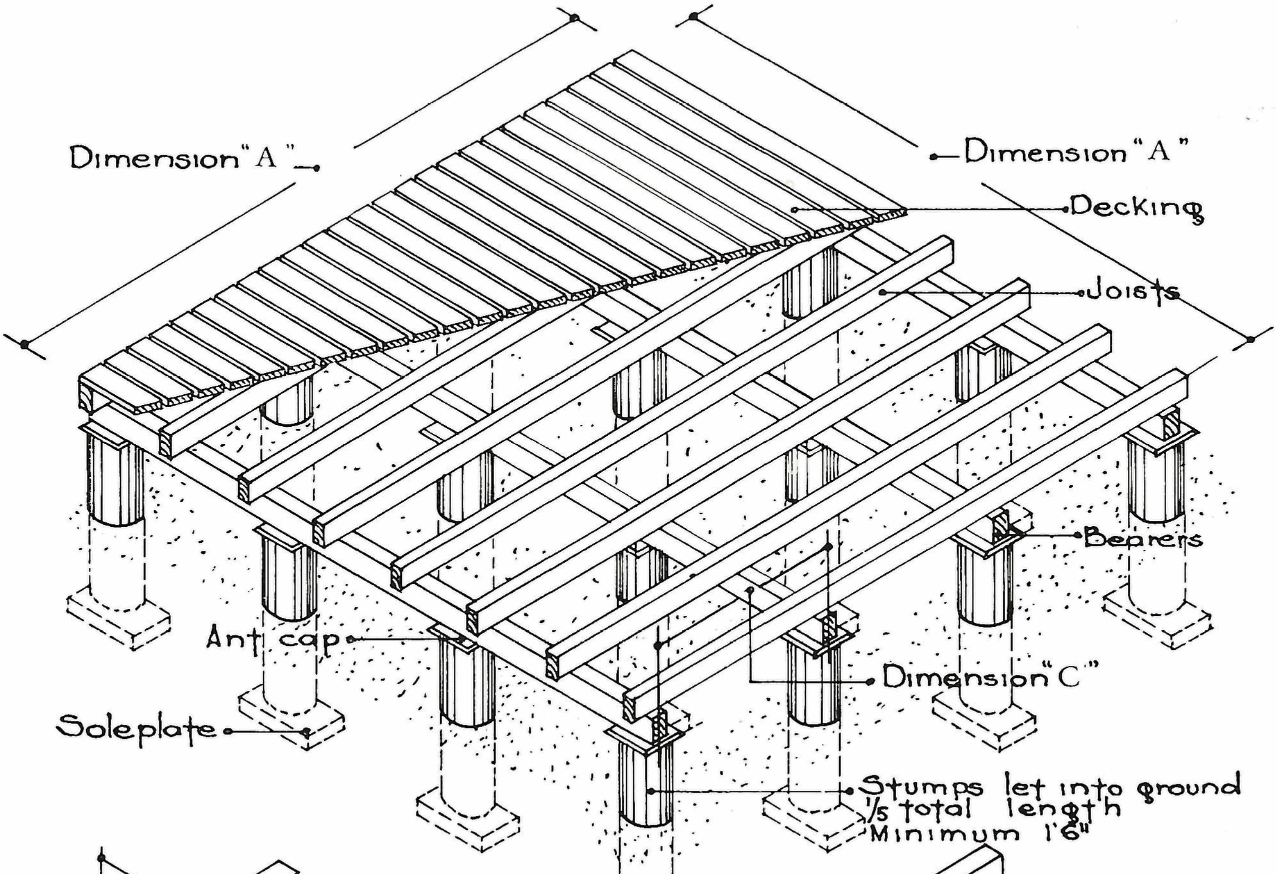
Capacity of Tank	Diameter of Tank	Side of Square Platform "A"	Distance between Piers	Joists		Bearers	Sole Plates 1 ton/sq. ft.
				Size	Spacing		
1,200	6' 3"	6' 6"	2' 9"	4" x 2"	15"	4" x 3"	Nil
1,500	7' 1"	7' 4"	3' 3"	4" x 2"	17"	4" x 3"	Nil
2,000	8' 3"	8' 6"	3' 6"	4" x 3"	20"	5" x 3"	10" x 2" x 15"
3,000	10' 0"	10' 3"	4' 0"	5" x 3"	24"	5" x 3"	10" x 2" x 15"

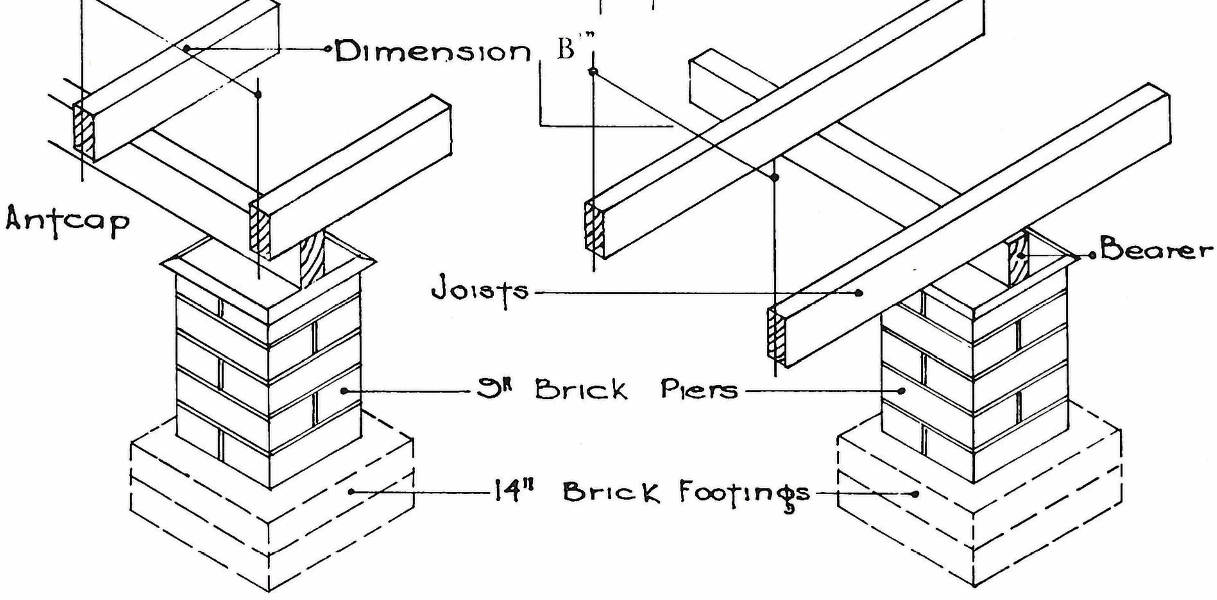
LIST OF QUANTITIES

	1,200 gallons	1,500 gallons	2,000 gallons	3,000 gallons
6" diameter stumps	9	9	9	9
Galvanized sheet Ant Caps (10" x 10" x 24g.)	9	9	9	9
Bearers, linear feet 4" x 3"	20	22	—	—
5" x 3"	—	—	26	31
Joists, linear feet 4" x 2"	40	44	—	—
4" x 3"	—	—	52	—
6" x 3"	—	—	—	62
Decking, 4" x 1$\frac{1}{4}$" linear feet	104	135	178	257

Quantities above are nett. Allowance should be made for wastage if necessary.

TANKSTANDS — 4,000-5,000 GALLONS TANK CAPACITY





ALTERNATIVE DETAILS SHOWING BRICK PIERS

TANKS AND TANKSTANDS

LYSAGHT'S
COUNTRY SERVICE

SHEET 4924

TANKSTANDS — 4,000-5,000 GALLONS TANK CAPACITY

GENERAL.—16-pier tankstands constructed with bush timber posts or brickwork are generally used for tanks of 4,000-5,000 gallons capacity.

PIERS.—As illustrated, the piers can be of 6"-8" diameter bush stumps or 9" brickwork. A number of improvisations, such as railway lines, railway sleepers, etc., can also be used. Round hardwood stumps are let into the ground 18" or 1/5th of the total height of the stump, whichever is the greater. These stumps are to have any bark stripped off, and to be thoroughly coated with creosote or other white ant deterrent mixture before erection. The bottom of the stumps are to be sawn true before placing on sole plates.

FOUNDATIONS.—The ground in country areas has a wide range of bearing possibilities. In order to be on the safe side, assume 1 ton/sq. foot for ordinary soils. For hard ground, 2 tons/sq. foot can be allowed.

For a 4,000-gallon galvanized tank the total load of the full tank and platform is about 18½ tons, or approximately 1⅛ tons per pier. If 1 ton/sq. foot is allowed for the ground, then a sole plate must be provided under each pier to provide 1⅛ sq. foot of area. Accordingly, 18" lengths of 10" x 2" sole plate or 18" lengths of 12" x 3" are used. A suitable sole plate is 18" of old railway sleeper.

Alternatively, the posts can be potted in concrete. In hard ground no sole plate is required for 4,000-5,000 gallon tanks.

CAPPING.—Over each stump or pier is fixed a 24g. galvanized sheet or Zincanneal white ant cap with edges turned down 1½" on all sides at an angle of 45°, all corners to be crimped.

BEARERS.—Bearers are to be a minimum of 5" x 3" hardwood spiked with 2-3" nails skew nailed to each stump. Sizes of bearers are given in the table below.

JOISTS.—Joists are to be a minimum of 4" x 2" hardwood, double nailed with 2-3" nails at each bearer.

DECKING.—Decking is to be 1¼" or 1" dry hardwood, preferably 4" wide, though any width up to 7" is suitable. This decking to be laid with a ¾"-1" space between pieces.

Each plank to be double nailed with 2-2" nails to each joist, the whole to finish plumb and level.

NOTE.—Care should be taken to select timber with a low moisture content and no sap present, especially the decking, as the presence of sap may set up a chemical reaction on the galvanized bottom of the tank and possibly lead to corrosion and subsequent leaks.

BRICKWORK.—If brick piers are used, 14" square footings are sufficient for 4,000 gallons. For 5,000 gallons use 18" square footings. In either case it is advisable to build the brick piers in cement mortar.

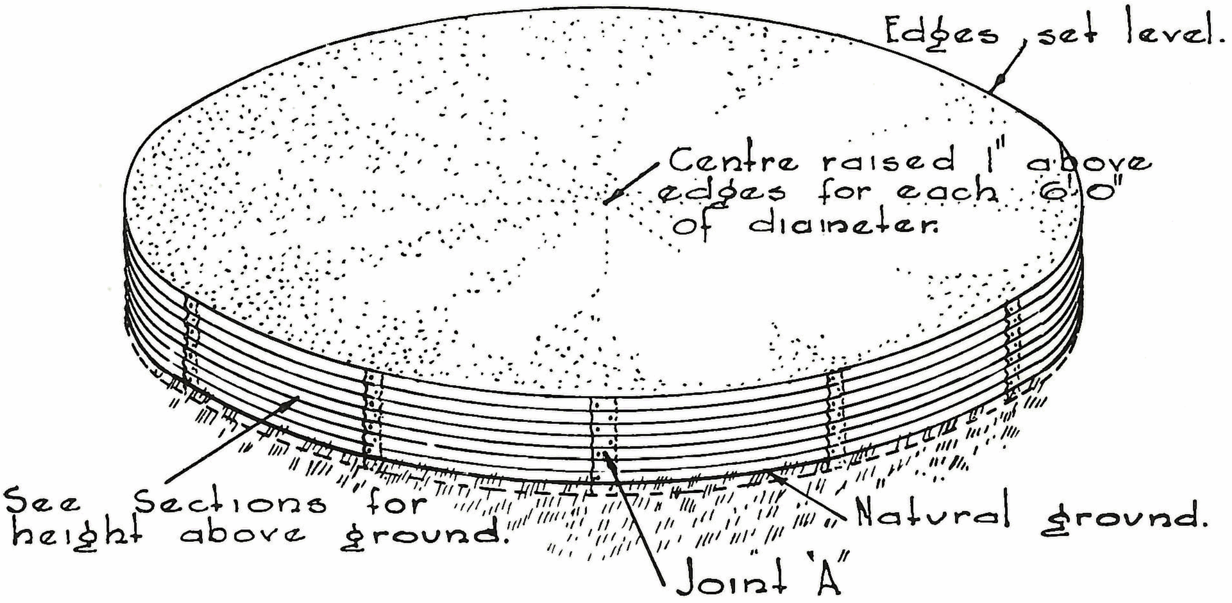
TANK CAPACITIES AND TIMBER SIZES

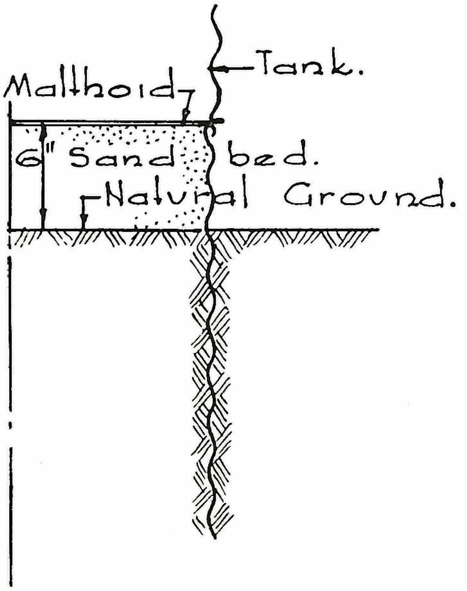
Capacity of Tank	Diameter of Tank	Side of Square Platform	Distance between Piers	Joists		Bearers	Sole Plates 1 ton/sq. ft.
				Size	Spacing		
4,000	11' 6"	11' 9"	3' 0"	4" x 2"	19½"	5" x 3"	10" x 2" x 18"
5,000	13' 0"	13' 3"	3' 4"	4" x 3"	22"	5" x 3"	10" x 2" x 18"

LIST OF QUANTITIES

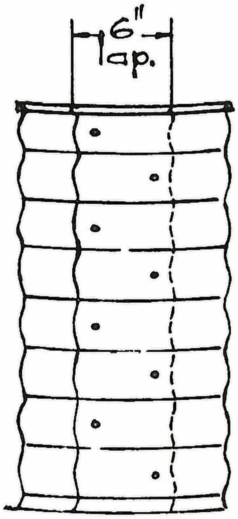
	4,000 Gallons	5,000 Gallons
6"-8" diameter stumps	16	16
Galvanized Sheet Ant Caps (10" x 10" x 24g.)	16	16
Bearers, linear feet 5" x 3"	47	53
Joists, linear feet 4" x 2"	94	—
4" x 3"	—	105
Decking, 4" x 1¼", linear feet	420	530

TANK PLATFORMS — EARTH RING

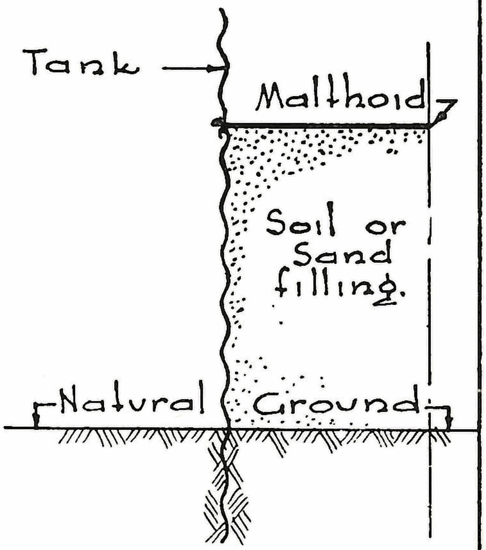

Edges set level.
Centre raised 1" above edges for each 6'0" of diameter.
See Sections for height above ground.
Natural ground.
Joint 'A'



SECTION
for large Tanks.



DETAIL OF JOINT "A"



SECTION
for small Tanks, where raised outlet is required.

TANK PLATFORMS — EARTH RING

GENERAL.—For tanks over 10,000 gallons capacity the most economical method of supporting tanks is on an earth platform enclosed in a ring made of corrugated galvanized iron. This is illustrated overleaf, and is almost invariably used with bolted tanks.

RING.—The ring is made of 24-gauge Lysaght's 8-3" corrugations ORB galvanized sheets curved to the required diameter and bolted together with $\frac{1}{4}$" diameter roofing bolts.

Alternatively the sheets can be riveted together with 3/16" diameter rivets.

This ring is sunk into the natural ground level (at least two corrugations) to obtain the desired height of platform.

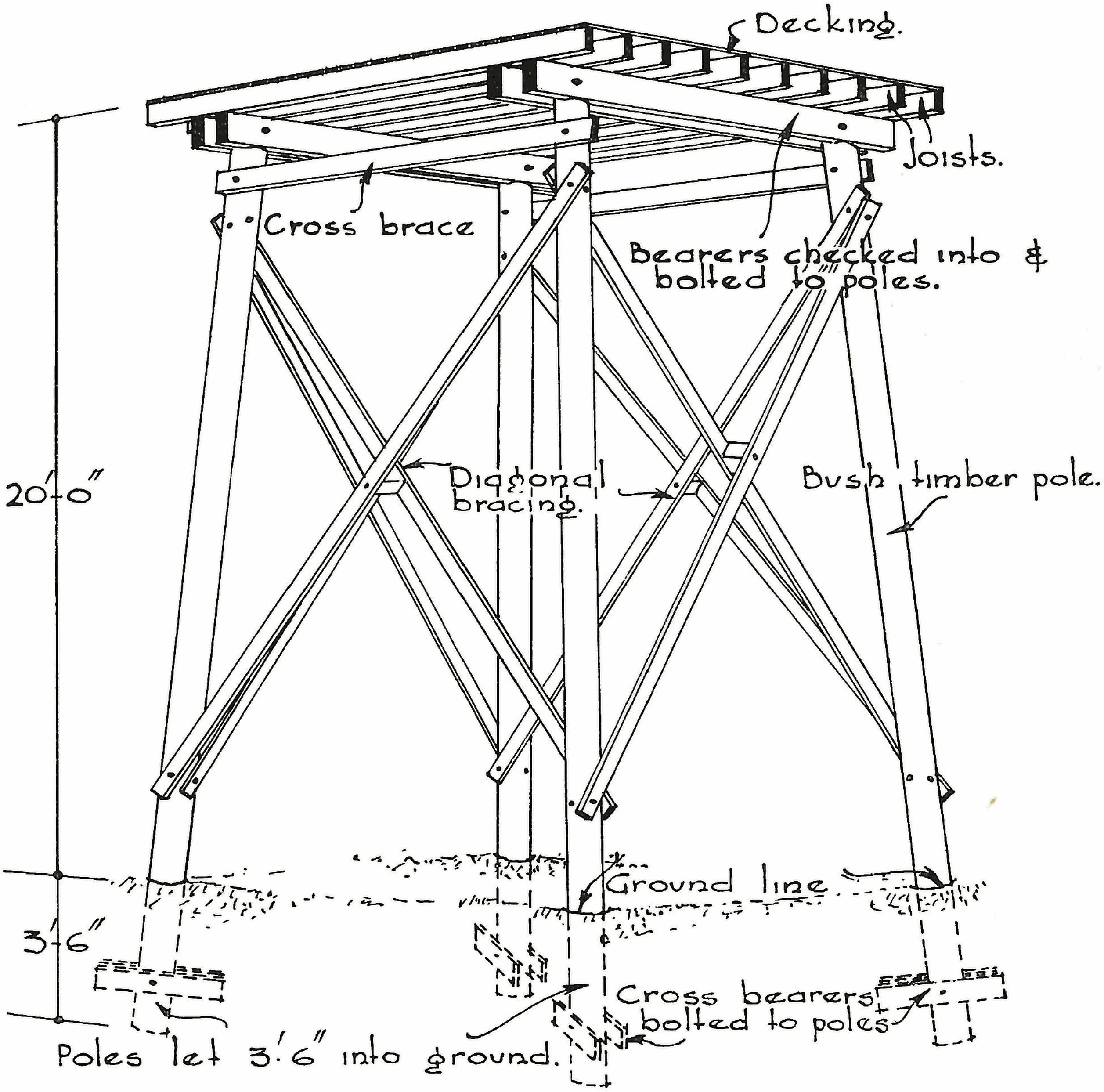
LAP.—The lap of sheets, as shown, namely, 6", is for tanks whose lap is 5"-6". In general, the mean diameter of the ring is slightly less than the mean diameter of the tank. The lap of the sheets in the ring should be $\frac{1}{4}$"-$\frac{1}{8}$" greater than the lap of joints in the tank when using sheets of the same length.

FILL.—The ring is preferably filled with sand, but if sand is scarce the natural soil can be used and the last 4"-6" finished off with sand. The fill should be rammed while placing, and the finished surface given a camber of 1" per 6' of diameter. This surface should be oiled before placing the tank bottom on it. Alternatively, a sheet of impregnated paper can be placed between the ground and the bottom of the tank.

PAINTING.—Before filling, the ring laps and inside of ring should be painted.

LYSAGHT
ORB
AUSTRALIA

ELEVATED TANKSTANDS — BUSH TIMBER POLES


Decking.
Joists.
Cross brace
Bearers checked into & bolted to poles.
20'-0"
Diagonal bracing.
Bush timber pole.
Ground line
3'6"
Cross bearers bolted to poles
Poles let 3'6" into ground.

TANKS AND
TANKSTANDS

LYSAGHT'S
COUNTRY SERVICE

SHEET 4932

ELEVATED TANKSTANDS — BUSH TIMBER POLES

GENERAL.—The diagram overleaf shows a suitable elevated tankstand constructed of bush timber poles and sawn timber. This type is most frequently met throughout the country, being particularly economical where bush timber is available. For tankstands over 3,000 gallon capacity more poles than four should be used, generally six up to 5,000 gallons, and nine or twelve for 10,000 gallons. For bolted tanks whose capacity as a rule exceeds 5,000 gallons each tankstand should be specially designed, and any particular problem can be referred to Lysaght's Service Department.

DECKING.—Decking is to be 1"-1¼" hardwood of whatever width available, laid with spacing ¾"-1¼" between boards. Each board is to be double nailed with 2-2" nails to each joist. Care should be taken to select timber with a low moisture content and not green timber, as the presence of sap may affect the galvanized bottom of the tank.

JOISTS.—Joists are to be hardwood double nailed with 3" nails at each bearer. Sizes as in the table below.

BEARERS.—Bearers (Capsills, Headstocks, or Transoms) to be hardwood. These can be solid, or split as shown and checked into the poles a minimum of 2". Each pair of bearers is fastened to the pole by 2-⅝" diameter bolts with square washers.

BRACING.—Cross braces are to be a minimum of 4" x 2" (6" x 3" is advisable in large tankstands) checked 2" into the legs and bolted with ⅝" diameter bolts and square washers. Diagonal braces are to be a minimum of 4" x 2" hardwood bolted to the legs with ⅝" bolts and washers.

POLES.—Bush timber poles should not exceed 30' in length, and should be true and straight, with a diameter not less than

8" for 15' tankstand
10" for 20' tankstand
12" for 25' tankstand.

Poles are let into the ground 3' 6", with bolsters (cross-bearers) of 4" x 2" rough hardwood checked into the pole and bolted 1' 0" from the bottom. Alternately poles can be potted in concrete. Bush timber should be barked before erection and the lower ends suitably treated either with creosote or termite deterrent compound.

Poles should be set into the ground at a slope of from 1 in 6 to 1 in 10, dependent upon the height of the tank.

FOUNDATIONS.—Most types of ground can be regarded as having a bearing value of one ton to two tons per square foot. Dependent on the weight of the full tank and platform, sufficient bearing area must be provided at the foot in the form of bolsters, sole plates, or preferably concrete, to distribute the total load.

The minimum dimensions of area of bearing to be provided if concrete footings are used are:—

Capacity of Tanks	Bearing Value of Ground			
	1 ton/sq. ft.		2 tons/sq. ft.	
	Round	Square	Round	Square
1,000	15" dia.	15" x 15"	12" dia.	12" x 12"
1,200	15" ,,	15" x 15"	12" ,,	12" x 12"
1,500	18" ,,	16" x 16"	12" ,,	12" x 12"
2,000	21" ,,	18" x 18"	15" ,,	14" x 14"
3,000	27" ,,	22" x 22"	18" ,,	16" x 16"
4,000	30" ,,	27" x 27"	21" ,,	18" x 18"
5,000	33" ,,	30" x 30"	24" ,,	20" x 20"

ELEVATED TANKSTANDS

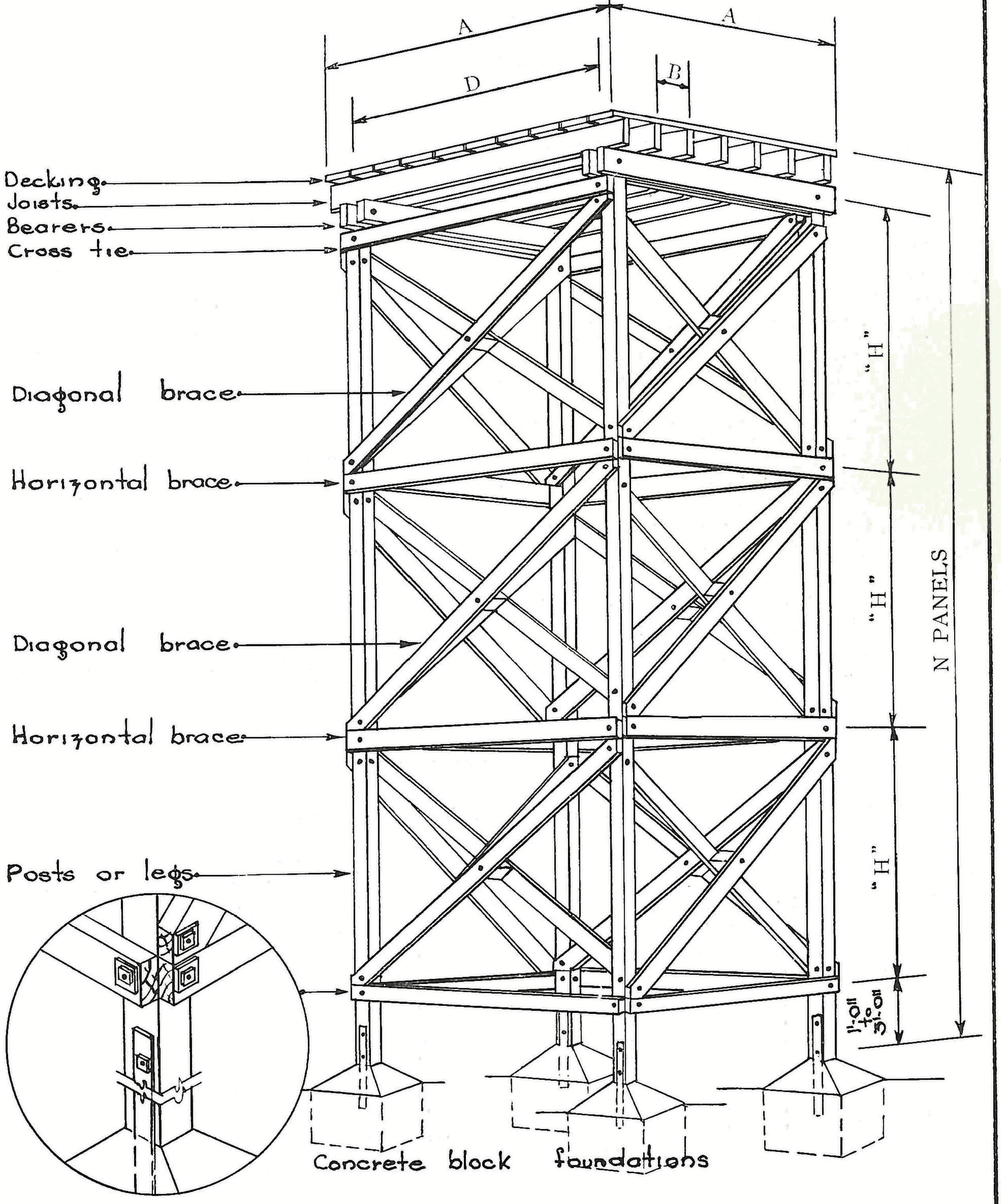
Table showing sizes of timbers and spacings for Bush Timber Elevated Tankstands.

Capacity Gallons	Diameter of Tank	Side of Square Platform "A"	Joists			Distance between centres of legs	Timbers in Headstocks	Cross Brace	Diagonal
			Number	Size	Approx. Spacing				
800	5' 0"	5' 6"	4	5" x 2"	20½"	3' 6"	5" x 2"	4" x 2"	4" x 2"
800 squat	6' 3"	6' 6"	5	4" x 2"	19"	4' 0"	5" x 2"	4" x 2"	4" x 2"
1,000 small	5' 7"	5' 11"	4	5" x 3"	22½"	4' 0"	6" x 2"	4" x 2"	4" x 2"
1,000 full size	5' 11"	6' 2"	4	5" x 3"	23½"	4' 0"	6" x 2"	4" x 2"	4" x 2"
1,000 squat	7' 4"	7' 7"	5	5" x 2"	22"	4' 6"	6" x 2"	4" x 2"	4" x 2"
1,200	6' 3"	6' 6"	5	5" x 2"	18½"	4' 0"	6" x 2"	4" x 2"	4" x 2"
1,500	7' 1"	7' 4"	5	6" x 2"	20½"	4' 6"	6" x 3"	5" x 2"	4" x 2"
2,000	8' 3"	8' 6"	6	6" x 3"	20"	5' 6"	6" x 3"	5" x 3"	5" x 3"
3,000	10' 0"	10' 3"	7	8" x 3"	20"	7' 0"	8" x 3"	5" x 3"	5" x 3"
4,000	11' 6"	11' 9"	8	8" x 4"	20"	8' 0"	8" x 4"	6" x 3"	5" x 3"
5,000	13' 0"	13' 3"	9	10" x 3"	19½"	9' 0"	10" x 4"	6" x 3"	5" x 3"

NOTE.— For 3,000-gallon tanks and above six legs or more are generally used.

The distance between centres of legs, listed above, is at bearer (or headstock) level.

ELEVATED TANKSTANDS — SAWN TIMBER



TANKS AND
TANKSTANDS

LYSAGHT'S
COUNTRY SERVICE

SHEET 4933

ELEVATED TANKSTANDS—SAWN TIMBER

GENERAL.—The isometric sketch overleaf shows a typical elevated tankstand constructed from sawn timber. The various lettered dimensions on the drawing serve as a guide to the tables below. These dealing with tankstands up to 30' high, for all tanks up to 5,000 gallons capacity. (Tankstands should be specially designed for bolted tanks or tanks over 5,000 gallons capacity.) Any particular problem can be referred to Lysaght's Service Department.

DECKING.—Decking is to be 1"-1¼" hardwood of whatever width available (up to 7"), laid with a spacing ¾"-1¼" between boards. Each board is to be double nailed with 2-2" nails to each joist. Care should be taken to select timber with a low moisture content, and not green timber, as the presence of sap may affect the galvanized bottom of the tank.

JOISTS.—Joists are to be hardwood double nailed with 3" nails at each bearer. Sizes as per table below.

BEARERS.—Bearers (Capsils, headstocks, or transoms) are to be hardwood. These can be solid, or split as shown, and checked into the legs a minimum of 1". Each pair of bearers is fastened to the legs by ⅝" diameter bolts with square washers.

BRACING.—Cross braces are to be a minimum of 4" x 2" hardwood, bolted to the legs with ⅝" diameter bolts and square washers.

Diagonal braces are to be a minimum of 4" x 2" hardwood, bolted to the legs with ⅝" bolts and washers.

LEGS.—Legs are to be a minimum of 4" x 4" hardwood, and where practicable should be in one piece. If the column has to be spliced, this should be done as close as practicable to the diagonal brace join to the leg.

Legs are bolted to concrete footings with 1" x ½" steel flat straps set in concrete. These straps are bolted to the legs with ½" bolts and washers. If considered necessary, the concrete footings can be poured around the timber legs.

NOTE.—Tanks should be tied down to the elevated platform with fencing wire. This prevents the tank, when empty, being blown off by the wind.

FOOTINGS.—The minimum dimensions of area of bearing to be provided with concrete footings are listed below:—

SIZE OF FOOTINGS

Tank Capacity Gallons	Bearing Value of Ground 1 ton/sq. ft.		Bearing Value of Ground 2 tons/sq. ft.	
	Round	Square	Round	Square
1,000	15" dia.	15" x 15"	12" dia.	12" x 12"
1,200	15" ,,	15" x 15"	12" ,,	12" x 12"
1,500	18" ,,	16" x 16"	12" ,,	12" x 12"
2,000	21" ,,	18" x 18"	15" ,,	14" x 14"
3,000	27" ,,	22" x 22"	18" ,,	16" x 16"
4,000	30" ,,	27" x 27"	21" ,,	18" x 18"
5,000	33" ,,	30" x 30"	24" ,,	20" x 20"

DIMENSIONS OF TANKSTANDS IN FEET

Tank Capacity Gallons	L. in ft.	H. in ft.	10' high		20' high		30' high	
			N	H in ft.	N	H in ft.	N	H in ft.
800-1,200	5	3- 6	2	4	4	4½	5	5½
1,200-1,500	5	4- 7	2	4½	3	6	4	7
2,000	6	4- 8	1	7	3	6	4	7
3,000	7	5-10	1	7	3	6	3	9
4,000	8	5-11	1	8	2	8	3	9
5,000	9	6-13	1	9	2	8	3	9

N is the number of panels; H the height of each panel.

ELEVATED TANKSTANDS

Table showing sizes of timbers and spacings for Sawn Timber Elevated Tankstands.

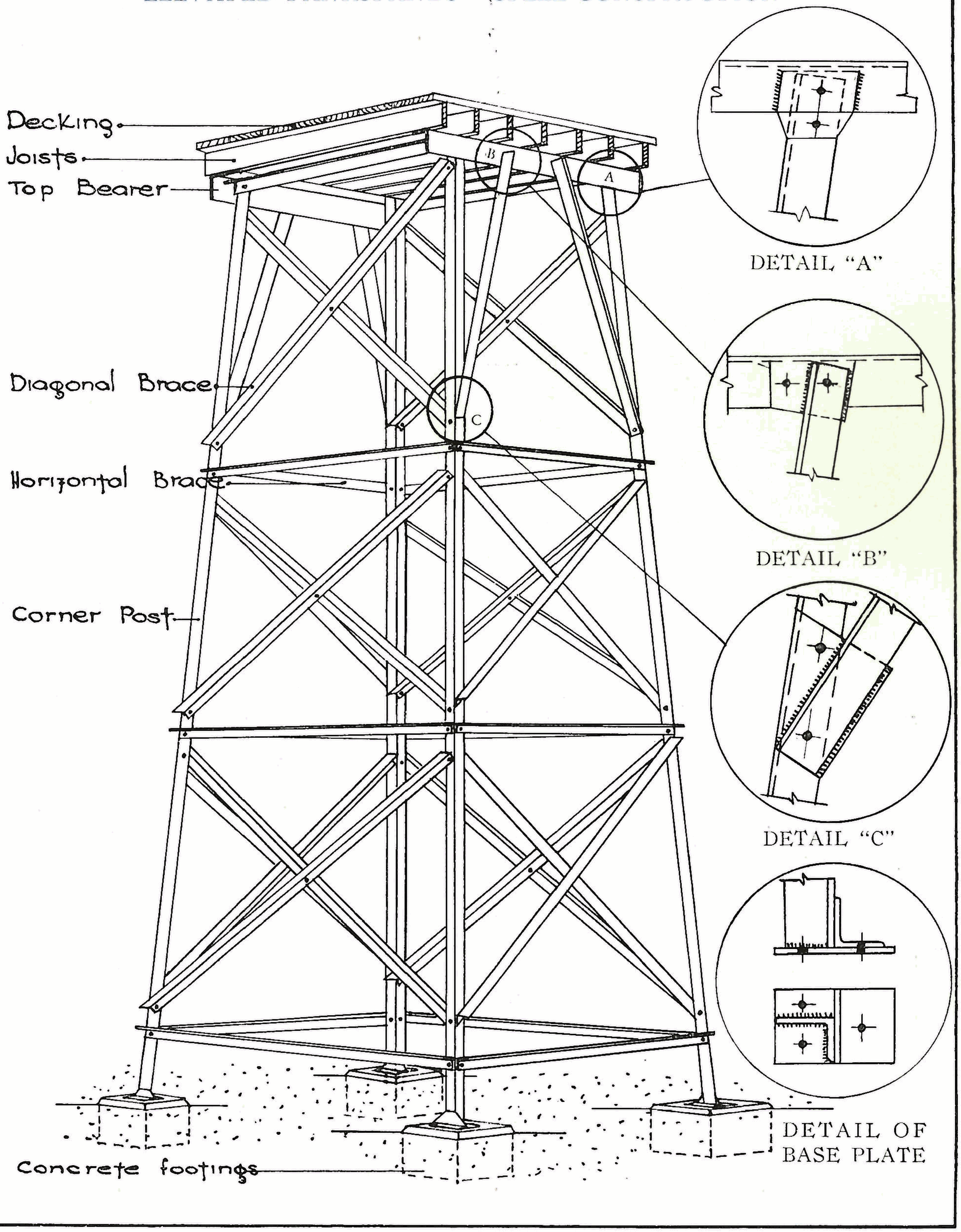
Capacity of Tanks Gallons	Diameter	Side of Square Platform "A"	Joists			Distance between centres of legs	Timbers in Head-stocks	Cross Brace	Diagonal Brace	Size of Leg
			Number	Size	Approx. Spacing					
800	5' 0"	5' 6"	4	5" x 2"	20½"	3' 6"	5" x 2"	4" x 2"	4" x 2"	4" x 4"
800 squat	6' 3"	6' 6"	5	4" x 2"	19"	4' 0"	5" x 2"	4" x 2"	4" x 2"	4" x 4"
1,000 small	5' 7"	5' 11"	4	5" x 3"	22½"	4' 0"	6" x 2"	4" x 2"	4" x 2"	4" x 4"
1,000 full size	5' 11"	6' 2"	4	5" x 3"	23½"	4' 0"	6" x 2"	4" x 2"	4" x 2"	4" x 4"
1,000 squat	7' 4"	7' 7"	5	5" x 2"	22"	4' 6"	6" x 2"	4" x 2"	4" x 2"	4" x 4"
1,200	6' 3"	6' 6"	5	5" x 2"	18½"	4' 0"	6" x 2"	4" x 2"	4" x 2"	4" x 4"
1,500	7' 1"	7' 4"	5	6" x 2"	20½"	4' 6"	6" x 3"	5" x 2"	5" x 2"	6" x 4"
2,000	8' 3"	8' 6"	6	6" x 3"	20"	5' 6"	6" x 3"	5" x 3"	5" x 3"	6" x 4"
3,000	10' 0"	10' 3"	7	8" x 3"	20"	7' 0"	8" x 3"	5" x 3"	5" x 3"	6" x 6"
4,000	11' 6"	11' 9"	8	8" x 4"	20"	8' 0"	8" x 4"	6" x 3"	6" x 3"	6" x 6"
5,000	13' 0"	13' 3"	9	10" x 3"	19½"	9' 0"	10" x 4"	6" x 3"	6" x 3"	6" x 6"

TANKS AND TANKSTANDS

LYSAGHT'S COUNTRY SERVICE

SHEET 4934

ELEVATED TANKSTANDS—STEEL CONSTRUCTION



TANKS AND
TANKSTANDS

LYSAGHT'S
COUNTRY SERVICE

SHEET **4934**

ELEVATED TANKSTANDS — STEEL CONSTRUCTION

GENERAL.—The diagram overleaf shows a steel construction tankstand suitable for heights up to 30 feet. This type of stand can be fabricated in the workshop and sent out to the site in pieces ready for erection. A number of city firms are well known for their prefabricated tankstands, which are provided in a standard series of sizes to cover the normal range of tanks. In the figures below, angle iron is used throughout, but it must be remembered that bearers can be of timber, channel or I-beam section, while the diagonal bracing, which is partly redundant, can be in flat sheet bar.

TANK PLATFORM.—The tank platform, of which the dimensions are given below, is the same for all elevated tankstands, whether they be in bush timber, sawn timber, or steel. Considering the range of tanks 800-5,000 gallons capacity, it is advisable, however, to keep to six standard sizes, which vary in the spacing of bearers by progressively increased whole numbers of feet, ranging from 4'-9'.

DECKING.— Decking is to be 1"-1¼" hardwood of whatever width available, laid with spacing 1"-1½" between boards. Each board is to be double nailed with 2-2" nails to each joist.

Care should be taken to select timber with a low moisture content and not green timber, as the presence of sap may affect the galvanized bottom of the tank.

JOISTS.—Joists are to be hardwood, sizes as in table below, double nailed with 3" nails to each timber bearer. If steel bearers are used, joists should be bolted to bearers with ½" bolts.

BEARERS (or HEADSTOCKS) are to be of rolled steel section (angle iron, channel, I-beam) or of best hardwood.

If these are of angle section they should be supported by bearer supporting braces. These are designed and connected to give sufficient strength to bear the proportion of the load directed on them. If bearers are of channel or I-beam section then no supporting braces are required, and diagonal bracing as used in other panels can be employed.

Bearers should be bolted to the legs or gusset plates on the legs, and to cross braces, with ⅝"-¾" field bolts.

LEGS.—Though the legs are designed to carry the dead load and a wind load on the side of the tank of 20 lbs./sq. ft., the controlling factor is generally the slenderness ratio, this dictating a size of angle that easily meets the strength requirements. In the smaller tanks the bearer is bolted direct to the leg, but in the large sizes, a gusset plate is welded to either leg or bearer (preferably leg) and a field joint made of ⅝" or ¾" bolts. ⅝" bolts should be used in 4,000 gallon capacity tanks, and ¾" bolts in 5,000 gallon capacity tanks.

Legs should be inclined at an angle of from 1/8th to 1/12th. One foot spread in 10 feet of height, or 1/10, is a convenient slope.

SUPPORT BRACE.—The support braces are designed to take approximatoly one-quarter of the load on any one bearer. In small sizes the support brace is bolted direct to the bearer and the leg.

In the 4,000-5,000 gallon sizes, gussets are welded on to the support brace in order to provide two bolt connections for the leg-brace and bearer-brace joints. These special joints are detailed in the sketch overleaf.

HORIZONTAL BRACES.—Horizontal braces take very little load, and are designed on a maximum slenderness ratio basis. Naturally, as the tankstand gets higher, the length of the bottom brace increases, and consequently so does the size. The table below shows sizes of braces suitable for 30'-high stands; for 10'-high stands sizes of angles could be reduced by ¼"-½".

DIAGONAL BRACES.—To allow of compressive stresses as well as tensile stress in diagonal members, angle sections are suggested in the design overleaf. As part of the bracing is always redundant, some designers suggest flat steel bars, provided the net section is as strong as the bolted joint. Thus 1½" x ½" flats are suitable for ⅝" bolted joints, and 2" x ½" for ¾" joints. Many manufacturers, however, regard the design (as overleaf) a more rigid construction.

FOOTINGS.—In the more rugged types of construction the lower six inches of the leg is split down the centre and the resultant flats bent back to form two pieces at right angles. These pieces can be set in concrete or fastened to "rag" bolts. The better construction, however, is to have welded on to the leg a baseplate as illustrated overleaf.

The minimum dimensions of area of bearing to be provided with concrete footings are listed below.

SIZES OF CONCRETE FOOTINGS

Tank capacity Gallons	Allowable Ground Pressure	
	1 ton/sq. ft.	2 tons/sq. ft.
1,000	15" x 15"	12" x 12"
1,200	15" x 15"	12" x 12"
1,500	16" x 16"	12" x 12"
2,000	18" x 18"	14" x 14"
3,000	22" x 22"	16" x 16"
4,000	27" x 27"	18" x 18"
5,000	30" x 30"	20" x 20"

SIZE OF TANKSTAND MEMBERS—TANKSTANDS UP TO 30' HIGH

Stand Size	Capacity of Tank	Side of Square Platform	Joists			Distance between Leg Centres	Size of Bearer Angle Iron	Size of Leg and Brace Support Angle Iron	Horizontal Brace Angle Iron	Diagonal Brace Angle Iron
			No.	Size	Approx. Spacing					
1	800	5' 6"	4	5" x 2"	20½"	4'	3" x 3" x ¼"	2" x 2" x ¼"	1½" x 1½" x 3/16"	1½" x 1½" x 3/16"
	800 squat	6' 6"	5	4" x 2"	19"	4'	3" x 3" x ¼"	2" x 2" x ¼"	1½" x 1½" x 3/16"	1½" x 1½" x 3/16"
	1,000 small	5' 11"	4	5" x 3"	22½"	4'	3" x 3" x ¼"	2" x 2" x ¼"	1½" x 1½" x 3/16"	1½" x 1½" x 3/16"
	1,000 full	6' 2"	4	5" x 3"	23½"	4'	3" x 3" x ¼"	2" x 2" x ¼"	1½" x 1½" x 3/16"	1½" x 1½" x 3/16"
2	1,000 squat	7' 7"	5	5" x 2"	22"	5'	3" x 3" x ¼"	2¼" x 2¼" x ¼"	1½" x 1½" x 3/16"	1½" x 1½" x 3/16"
	1,500	7' 4"	5	5" x 2"	20½"	5'	3" x 3" x ¼"	2¼" x 2¼" x ¼"	1½" x 1½" x 3/16"	1½" x 1½" x 3/16"
3	2,000	8' 6"	6	6" x 3"	20"	6'	3½" x 3½" x ⅜"	2½" x 2½" x ¼"	2½" x 2¼" x ¼"	1¾" x 1¾" x 3/16"
4	3,000	10' 3"	7	8" x 3"	20"	7'	4" x 4" x ⅜"	3" x 3" x ¼"	3" x 3" x ¼"	2" x 2" x 3/16"
5	4,000	11' 9"	8	8" x 4"	20"	8'	4" x 4" x ⅜"	3½" x 3½" x ¼"	3½" x 3½" x ¼"	2½" x 2½" x ¼"
6	5,000	13' 3"	9	10" x 3"	19½"	9'	4" x 4" x ⅜"	4" x 4" x ⅜"	4" x 4" x ⅜"	2½" x 2½" x ¼"

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